Electronic Supplementary Material (ESI) for ChemComm.

SUPPORTING INFORMATION

Plasma flow chemistry for direct *N*-Acylation of amines by esters

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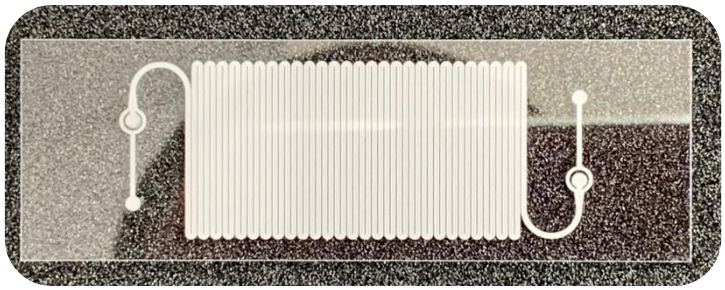
General Methods

All the plasma reactions were carried in a gas/liquid biphasic microreactor Biflow2.7 (picture below).



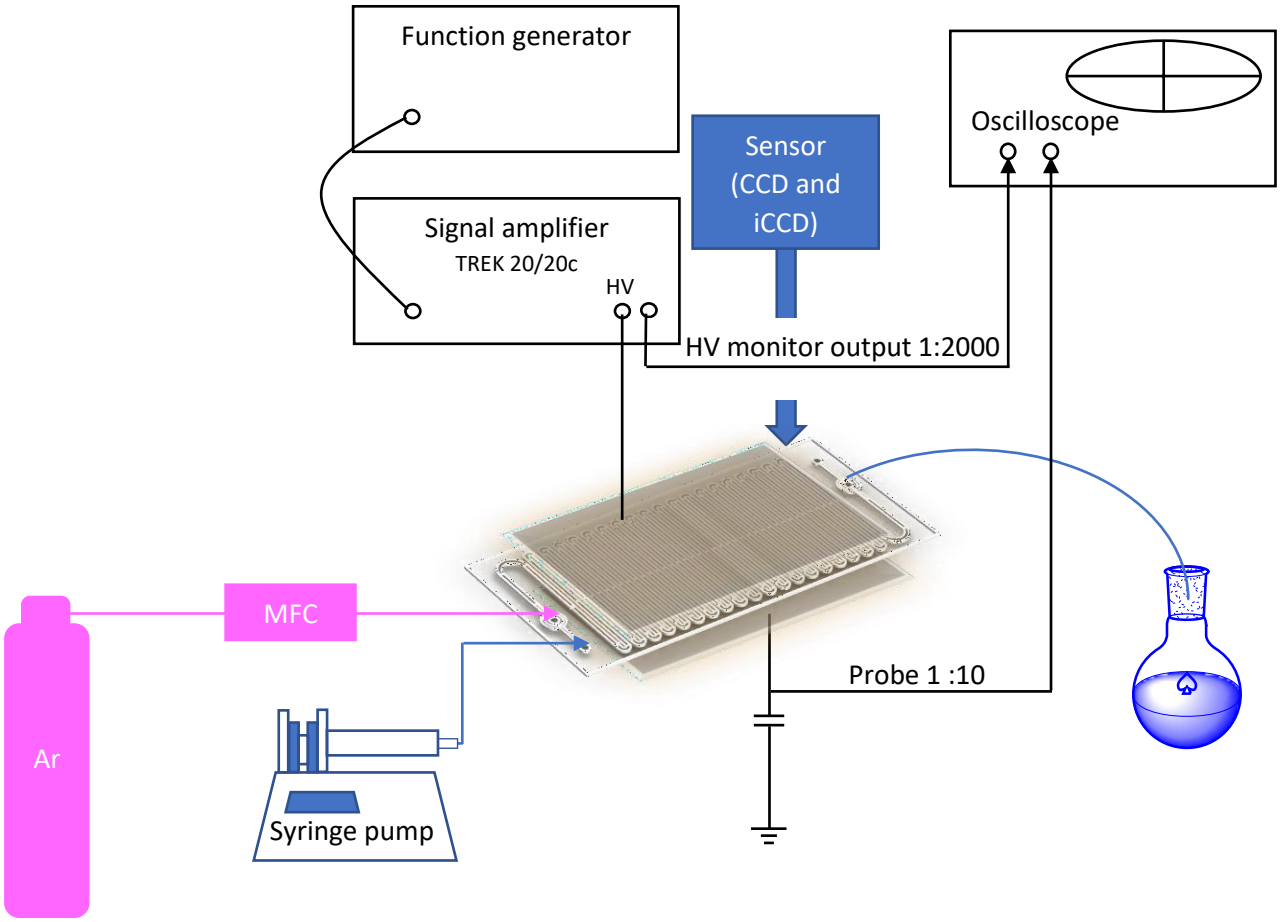
All chemicals obtained from commercial sources were used as supplied without any further purification unless stated. The solvents (EtOAc, hexane) used for column chromatography were purified by distillation. Column chromatography was performed on Merck silica gel (40-63 µm mesh) or on alumina (Al_2O_3 , 150 mesh) under air pressure. Analytical thin layer chromatography (TLC) was performed on silica gel 60 F254 aluminum plates (Merck). TLC plates were visualized at 254 nm and/or $KMnO_4$ staining solution followed by heating. ^{1}H- and ^{13}C-NMR spectra were recorded at room temperature on a Bruker Avance III^{TM} HD 400 MHz. Chemical shifts (δ scale, in ppm) were referenced as follows: $CDCl_3$ referenced to solvent signal: 7.26 ppm for ^{1}H NMR and 77.16 ppm for ^{13}C NMR. The multiplicities of the signals are reported as s (singlet), brs (broad singlet), d (doublet), t (triplet), t_{app} (apparent triplet), dt (doublet of triplet), td (triplet of doublet), brt_{app} (apparent broad triplet), q (quartet), q_{app} (apparent quartet), p_{app} (apparent pentuplet), pd_{app} (apparent pentuplet of doublet), sept (septuplet), m (multiplet or overlap). Coupling constants (J) are given in Hz.
GC/MS spectra were obtained using Agilent GC system 7890B and mass spectra from Agilent 5977B equipped with electron impact ionization source (EI). Infrared spectra (ATR) were recorded using a Thermo SCIENTIFIC Nicolet iS5 – iD7 ATR FTIR spectrometer. Wavenumbers (ν^{max}) are reported in cm^{-1}. Optical rotations were measured on an Anton Paar MCP 100 polarimeter at 25°C.
Plasma generation:
A sine (sinusoid) wave signal (AC) was sent from a function generator RS PRO (AFG-21025) to a voltage amplifier (TREK 20/20c high voltage amplifier ×2000) which multiplies the input voltage by 2000. This high voltage was applied to the microreactor and a 14.F nF capacitor in series and was monitored with an oscilloscope (PicoScope 5000 Series) through the 2000:1 output monitor of the amplifier. The capacitor mounted, in a serie circuit with the reactor is necessary to calculate the discharge power, and the capacitance voltage was measured via a low voltage probe (Teledyne LeCroy PP024 500 MHz 10:1). The frequency used was between 2 kHz, and the high voltage was between 20 and 30 kVpp.

General procedure GP1 for the preparation of *N*-acylamines

In a Biflow2.7 reactor equipped with a planar copper electrode and maintained at 30 °C unless stated, a solution of amine in ester (0.1M) was pumped in the reactor using a syringe pump with a flow rate of 12µL/min, and simultaneously argon (Ar) gas was introduced using a Mass Flow Controller (MFC) at a 1.5 sccm flow rate. At these flow rates (12 µL/min and 1.5 sccm), biphasic laminar flow was obtained (the control was made using a CCD camera).

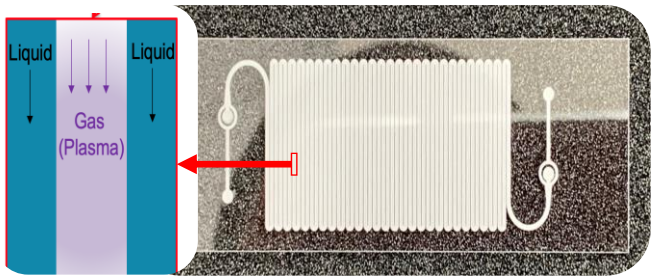
Once the biphasic laminar flow was obtained, the plasma discharge was initiated by using an alternative function generator (AFG – sinusoidal wave at 2kHz) and a voltage amplifier (Trek 20/20C). The voltage was adjusted slowly until it reached 25 kV_{PP}. Once 25 kV_{PP} was reached, 5 min were necessary to reach the equilibrium. The reaction mixture is collected over a period of 6 h. The solvent was then evaporated under vacuum and the purification of the acylated compound was realized. Purifications by column chromatography on silica gel or alumina were achieved.

Setup Scheme



Biflow 2.7 microreactor

These designed plasma microreactors allow a fine-tuning control of the plasma induced species which have short lifetimes and are extremely reactive. It is worth mentioning that the microfluidic microreactors allow the formation of a parallel biphasic gas/liquid and microflows inside the reactor channels. The gas is pumped in the central channel, while the liquid is pumped in the two side channels parallel to the gas channel. Furthermore, the reactor equipped with a metallic electrode can generate a plasma in the gas phase. For the characterization of the plasma and the synthetic part, we were using two types of electrodes: a comb shaped gold electrodes and a planar copper electrodes. The comb shaped electrodes allow optical observation e.g., the visualization of the plasma inside the channels and the characterization of the gas/liquid flow and the plasma discharge. After these characterizations, planar copper electrodes were used to produce a more homogeneous electrical field inside the channels and greater plasma volume, allowing reactions to be performed up to 100 mg scale.



Picture of the glass microreactor and a zoom on single microfluidic channel (top view)

Biphasic flow and Plasma discharge characterization (Microreactor Biflow 2.7)

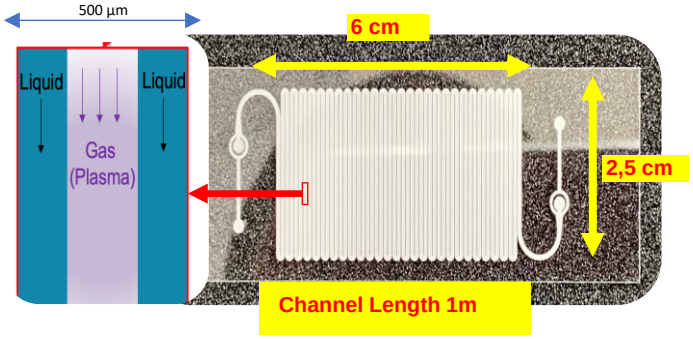


Figure 1 Picture of the glass microreactor and a zoom on single microfluidic channel (top view)

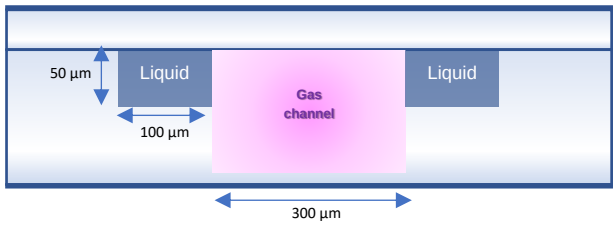


Figure 2 transverse cut in in the microfluidic channel

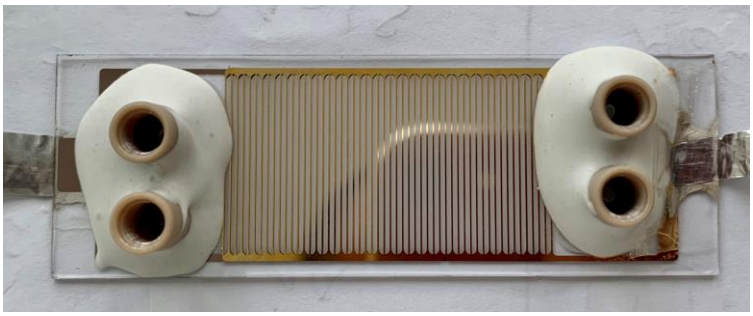


Figure 3 Glass microreactor equipped with comb shape gold electrode

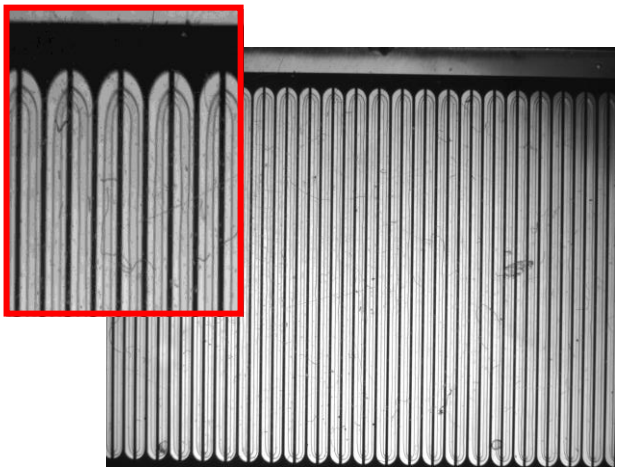


Figure 4 Biphasic flow captured using CCD camera. Comb shape electrode (In black). Close-up view (red square)

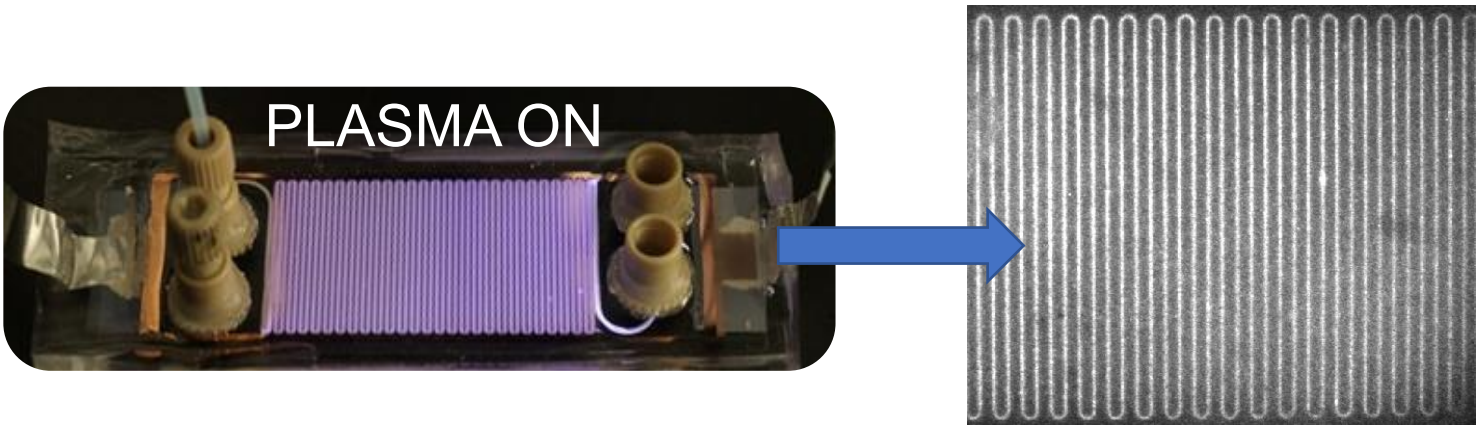


Figure 5 Plasma discharge inside the channel captured using ultra-fast iCCD camera

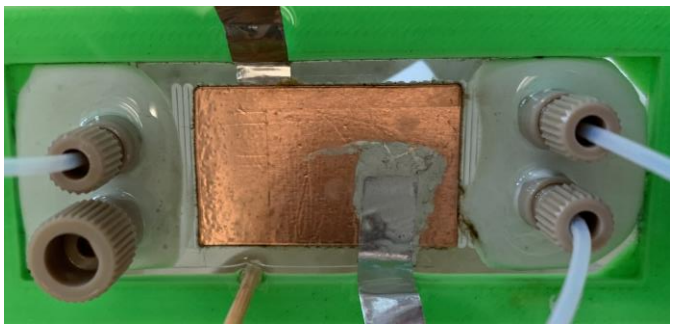
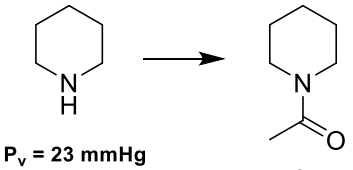


Figure 6 Glass microreactor equipped with planar copper electrode

Characterization Data

***N*-Acetylpiperidine[1] (3a)**



P_v = 23 mmHg

3a

Chemical Formula: $C_7H_{13}NO$
Molecular Weight: 127.19

Compound **3a** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of piperidine (30 mg, 0.35 mmol) in *t*-butyl acetate (3.5 mL). *t*-Butyl acetate was evaporated under reduced pressure, and the residue was diluted with EtOAc (10 mL), the organic layer was washed with an aqueous bicarbonate solution (10%) (2 x 5 mL), brine (2 x 5 mL) and then dried over $MgSO_4$. The solvent was evaporated, providing **3a** as a yellowish oil (41 mg, yield = 93%).

R_f = 0.3 (EtOAc/Hex = 20:80)

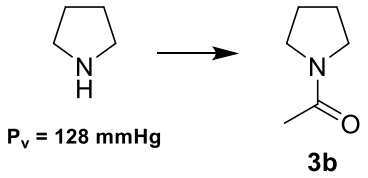
IR (neat): 1730, 1624, 1440, 1365, 1256, 1238, 1146, 1128, 1054,1026, 986 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 3.50 (brt_{app}, *J* = 5.6 Hz, 2H), 3.35 (brt_{app}, *J* = 5.6 Hz, 2H), 2.04 (s, 3H), 1.65 – 1.56 (m, 2H), 1.56 – 1.45 (m, 4H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 168.8, 47.5, 42.5, 26.5, 25.5, 24.5, 21.5.

GC/MS - EI**:** *m/z* 127 (M^+, 96), 112 (20), 99 (11), 84 (100), 70 (39), 56 (41), 43 (47).

***N*-Acetylpyrrolidine[1] (3b)**



Chemical Formula: $C_6H_{11}NO$
Molecular Weight: 113.16

Compound **3b** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of pyrrolidine (37 mg, 0.52 mmol) in *t*-butyl acetate (5.2 mL). *t*-Butyl acetate was evaporated under reduced pressure, and the crude was purified by flash column chromatography on silica gel (EtOAc/MeOH = 98:2) providing **3b** as a yellowish oil (13 mg, yield = 22%).

R_f = 0.39 (EtOAc/MeOH = 95:5)

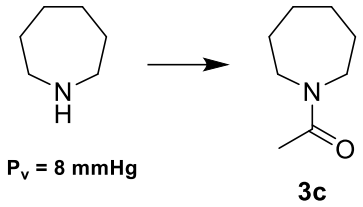
IR (neat): 1619, 1442, 1356, 1343, 1253,1227,1193, 1168, 1069, 1019, 987, 952 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$) δ = 3.42 (dt, *J* = 15.6, 6.8 Hz, 4H), 2.04 (s, 3H), 1.98 – 1.90 (m, 2H), 1.89 – 1.80 (m, 2H).

^{13}C NMR (101 MHz, $CDCl_3$) δ = 169.2, 47.4, 45.5, 26.1, 24.6, 22.5.

GC/MS - EI**:** *m/z* 113 (M^+, 96), 98 (4.9), 85 (23), 70 (100), 55 (9), 43 (95).

***N*-Acetylazepane[1] (3c)**



P_v = 8 mmHg

3c

Chemical Formula: $C_8H_{15}NO$
Molecular Weight: 141.21

Compound **3c** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of azepane (42 mg, 0.42 mmol) in *t*-butyl acetate (4.2 mL). *t*-Butyl acetate was evaporated under reduced pressure, and the residue was diluted with EtOAc (10 mL), the organic layer was washed with an aqueous bicarbonate solution (10%) (2 x 5 mL), brine (2 x 5 mL) and then dried over $MgSO_4$. The solvent was evaporated, providing **3c** as a yellowish oil (57 mg, yield = 95%).

R_f = 0.1 (EtOAc/Hex = 50:50)

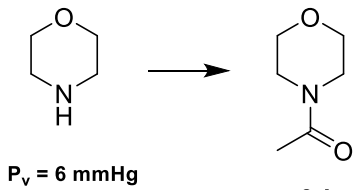
IR (neat): 1730, 1633, 1424, 1374, 1274, 1204, 1101, 1056, 970 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 3.52 (brt_{app}, *J* = 6.0 Hz, 2H), 3.41 (brt_{app}, *J* = 6.0 Hz, 2H), 2.09 (s, 3H), 1.75 – 1.65 (m, 4H), 1.61 – 1.51 (m, 4H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 170.3, 48.8, 45.9, 29.2, 27.7, 27.2, 27.0, 21.7.

GC/MS – EI**:** *m/z* 141 (M^+, 100), 126 (56), 112 (13), 98 (52), 84 (71), 70 (68), 56 (52), 43 (92).

***N*-Acetylmorpholine[1] (3d)**



P_v = 6 mmHg

3d

Chemical Formula: $C_6H_{11}NO_2$
Molecular Weight: 129.16

Compound **3d** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of morpholine (37 mg, 0.43 mmol) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was diluted with EtOAc (10 mL), the organic layer was washed with 10% bicarbonate (2 x 5mL) and brine (2 x 5 mL), dried over $MgSO_4$. The solvent was evaporated, providing **3d** as a yellowish oil (47 mg, yield = 85%).

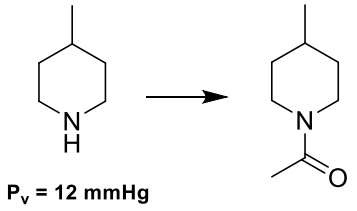
IR (neat):1625,1425, 1361, 1330, 1300, 1269, 1249, 1112, 1067, 1020, 994 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 3.70 – 3.62 (m, 4H), 3.62 – 3.56 (m, 2H), 3.49 – 3.39 (m, 2H), 2.07 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 169.3, 67.0, 66.7, 46.8, 41.9, 21.2.

GC/MS - EI**:** *m/z* 129 (M^+, 57), 114 (39), 99 (6), 86 (63), 72 (11), 57 (100), 43 (70).

***N*-Acetyl-4-methyl-piperidine[2] (3e)**



P_v = 12 mmHg

3e

Chemical Formula: $C_8H_{15}NO$
Molecular Weight: 141.21

Compound **3e** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of 4-methylpiperidine (45 mg, 0.45 mmol) in *t*-butyl acetate (4.5 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was purified by flash column chromatography on silica gel (EtOAc/Hex = 7:3), providing **3e** as a yellowish oil (55 mg, yield = 87%).

R_f = 0.3 (EtOAc/MeOH = 65:35).

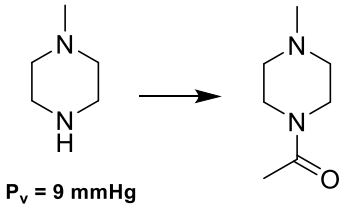
IR (neat): 1635, 1442, 1427, 1369, 1306, 1268, 1240, 1208, 1150, 1084, 1056, 1032, 1013, 970 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 4.50 (pd_{app}, *J* = 13.6, 2.0 Hz, 1H), 3.71 (pd_{app}, *J* = 13.6, 2.0 Hz, 1H), 2.97 (td, *J* = 12.4, 2.8 Hz, 1H), 2.48 (td, *J* = 13.2, 2.4 Hz, 1H), 2.03 (s, 3H), 1.66 – 1.51 (m, 3H), 1.10 – 0.97 (m, 2H), 0.89 (d, *J* = 6.5 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 168.9, 46.8, 41.9, 34.6, 33.7, 31.0, 21.7, 21.5.

GC/MS - EI**:** *m/z* 141 (M^+,100), 126 (53), 113 (10), 98 (81), 84 (65), 70 (14), 57 (53), 43 (65).

1-(*N*-Acetyl)-4-(*N'*-methyl)piperazine[3] (3f)



P_v = 9 mmHg

3f

Chemical Formula: $C_7H_{14}N_2O$
Molecular Weight: 142.20

Compound **3f** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of 1-methylpiperazine (47 mg, 0.47 mmol) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was purified by flash column chromatography on alumina (EtOAc/MeOH = 98:2) providing **3f** as a yellowish oil (54 mg, yield = 80%).

R_f = 0.3 (Alumina EtOAc/MeOH = 98:2).

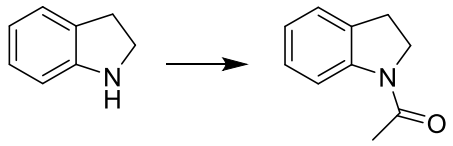
IR (neat): 1620, 1438, 1367, 1334, 1290, 1262, 1242, 1171, 1137, 1072, 1049, 997 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 3.55 (brt_{app}, *J* = 5.2 Hz, 2H), 3.40 (brt_{app}, *J* = 4.8 Hz, 2H), 2.31 (dt, *J* = 13.6, 5.2 Hz, 4H), 2.23 (s, 3H), 2.01 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 168.9, 55.0, 54.6, 46.2, 46.0, 41.3, 21.3.

GC/MS - EI**:** *m/z* 142 (M^+, 37), 127 (4), 99 (60), 83 (24), 70 (100), 58 (53), 43 (56).

***N*-Acetylindoline[4,5] (3g)**



P_v = - mmHg

3g

Chemical Formula: $C_{10}H_{11}NO$
Molecular Weight: 161.20

Compound **3g** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of indoline (51 mg, 0.43 mmol) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was purified by flash column chromatography on silica gel (EtOAc/Hex = 1:1) which provided **3g** as a white solid (63 mg, yield = 90%). Two rotamers are present in a ratio 85:15.

R_f = 0.31(EtOAc/Hex 1:1).

m.p. : 98 – 100 °C

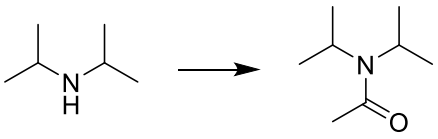
IR (film):1652, 1598, 1479, 1460, 1435, 1396, 1358, 1338, 1318, 1292, 1254, 1220, 1171, 1124, 1093, 1050, 1031, 1019, 986, 942 cm^{-1}.

^{1}H NMR (400MHz, $CDCl_3$): **Major rotamer** δ = 8.20 (d, *J* = 8.0 Hz, 1H), 7.21-7.12 (m, 2H), 7.00 (td, *J* = 7.6, 0.8 Hz, 1H), 4,01 (t_{app}, *J* = 8.4 Hz, 2H), 3.16 (t_{app}, *J* = 8.4 Hz, 2H), 2.2 (s, 3H). **Minor rotamer** δ = 8.20 (d, *J* = 8.0 Hz, 1H), 7.21-7.12 (m, 2H), 7.00 (td, *J* = 7.6, 0.8 Hz, 1H), 4,11 (t_{app}, *J* = 8.0 Hz, 2H), 3.05 (t_{app}, *J* = 8.0 Hz, 2H), 2.42 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): **Major rotamer** δ = 168.8, 142.9, 131.2, 127.5, 124.6, 123.6, 116.9, 48.8, 28.1, 24.3. **Minor rotamer** δ = 168.4, 141.8, 133.8, 127.3, 125.9, 123.2, 114.1, 48.0, 26.9, 24.6.

GC/MS - EI**:** *m/z* 161 (M^+, 45), 118 (100), 91 (16), 65 (7), 43 (7).

***N*-Acetyl, *N*,*N*-diisopropylamine[1] (3h)**



P_v = 50 mmHg

3h

Chemical Formula: $C_8H_{17}NO$
Molecular Weight: 143.23

Compound **3h** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of N,N-diisopropylamine (30 mg, 0.35 mmol) in *t*-butyl acetate (3.5 mL).*t*-Butyl acetate was evaporated under reduced pressure, and the residue was diluted with EtOAc (10 mL), the organic layer was washed with an aqueous bicarbonate solution (10%) (2 x 5 mL), brine (2 x 5 mL) and then dried over $MgSO_4$. The solvent was evaporated, providing **3h** as a yellowish oil (7.5 mg, yield = 15%).

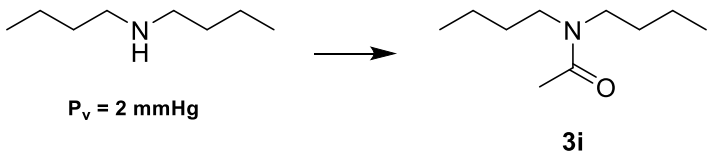
IR (neat): 2999, 2965, 2931, 1632, 1440, 1431, 1357, 1369, 1323, 1217, 1160, 1135, 1044, 1019, 939 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ =.3.71 (sept, *J* = 6.8 Hz, 1H), 3.33 (m, 1H), 1.88 (s, 3H), 1.18 (d, *J* = 6.9 Hz, 6H), 1.02 (d, *J* = 6.8 Hz, 6H)

^{13}C NMR (101 MHz, $CDCl_3$): δ = 169.1, 49.1, 45.1, 23.7, 20.7, 20.3.

GC/MS - EI**:** *m/z* 143 (M^+, 31), 128 (5), 100 (30), 86 (100), 70 (5), 58 (25), 44 (37).

***N*-Acetyl, *N*,*N*-dibutylamine[6] (3i)**



Chemical Formula: $C_{10}H_{21}NO$
Molecular Weight: 171.28

Compound **3i** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of *N*,*N*-dibutylamine (55 mg, 0.43 mmol) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, providing product **3i** as a pale yellow oil (73 mg, yield = quant).

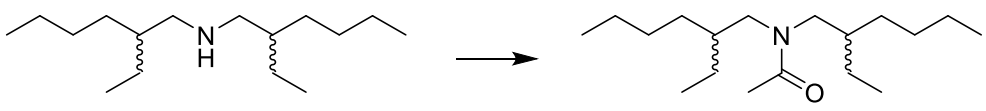
IR (neat): 1638, 1455, 1421, 1375, 1293, 1255, 1225, 1198, 1158, 1112, 1036, 968 cm^{-1}

^{1}H NMR (400 MHz, $CDCl_3$): δ = 3.30 – 3.26 (m, 2H), 3.23 – 3.17 (m, 2H), 2.07 (s, 3H), 1.59 – 1.40 (m, 4H), 1.38 – 1.20 (m, 4H), 0.95 (t, *J* = 7.2 Hz, 3H), 0.91 (t, *J* = 7.2 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 170.3, 48.7, 45.6, 31.2, 30.0, 21.6, 20.4, 20.2, 14.0, 13.9.

GC/MS - EI**:** *m/z* 171 (M^+, 5), 156 (13), 142 (2), 128 (30), 114 (7), 100 (12), 86 (100), 72 (7), 57 (6), 44 (23).

***N*-Acetyl, *N*,*N*-diethylhexylamine (3j)**



$P_v = 15e^{-3}$ mmHg

3j

Chemical Formula: $C_{18}H_{37}NO$
Molecular Weight: 283.50

Compound **3j** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of *N*,*N*-diethylhexylamine (104 mg, 0.43 mmol) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was purified by flash column chromatography on silica gel (EtOAc/Hex = 8:2), providing **3j** as a pale yellow oil (107 mg, yield = 87%).

R_f = 0.3 (EtOAc/Hex = 8:2).

IR (neat): 1644, 1456, 1421, 1378, 1233, 1185, 1152, 1108, 1035, 975 cm^{-1}.

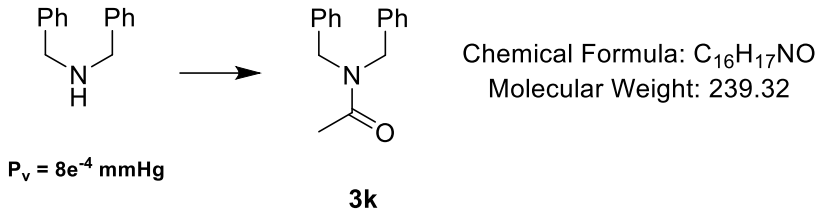
^{1}H NMR (400 MHz, $CDCl_3$): δ = 3.32 – 3.16 (m, 2H), 3.10 (d, *J* = 7.5 Hz, 2H), 2.06 (s, 3H), 1.70 – 1.50 (m, 2H), 1.35 – 1.10 (m, 16H), 0.95 – 0.75 (m, 12H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 171.0, 52.2, 48.4, 38.4, 37.0, 30.7, 30.6, 28.9, 28.8, 24.0, 23.9, 23.2, 23.1, 22.1, 14.2, 14.1, 11.0, 10.8.

GC/MS - EI**:** *m/z* 283 (M^+, 1), 184 (84), 170 (9), 142 (100), 86 (36), 71 (5), 57 (12), 44 (20).

HRMS (ESI) *m/z*: $[M+H]^+$ Calcd for $C_{18}H_{37}NOH$ 284.2948. Found 284.2944

***N*-Acetyl, *N*,*N*-dibenzylamine[7] (3k)**



Compound **3k** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of *N*,*N*-dibenzylamine (86 mg, 0.44 mmol) in *t*-butyl acetate (4.4 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was purified by flash column chromatography on silica gel (EtOAc/Hex = 4:6), providing **3k** as a pale yellow oil (97 mg, yield = 93%).

R_f = 0.39 (EtOAc/Hex = 1:1).

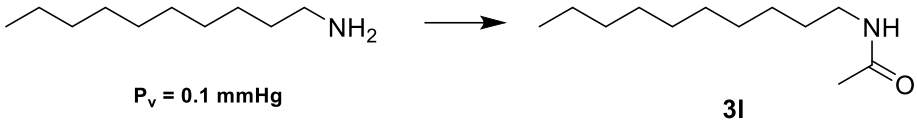
IR (neat): 1641, 1494, 1469, 1418, 1360, 1238, 1205, 1166, 1060, 1028, 983, 951 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.42 – 7.13 (m, 10H), 4.60 (s, 2H), 4.44 (s, 2H), 2.22 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 171.3, 137.5, 136.6, 129.1, 128.7, 128.5, 127.8, 127.5, 126.5, 50.9, 48.1, 21.8.

GC/MS - EI: *m/z* 239 (M^+, 4), 148 (55), 120 (2), 106 (100), 91 (50), 79 (10), 65 (13), 43 (11).

***N*-Acetyldecylamine[1] (3l)**



P_v = 0.1 mmHg

3l

Chemical Formula: $C_{12}H_{25}NO$
Molecular Weight: 199.34

Compound **3l** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of decylamine (67 mg, 0.43 mmol, 1.0 equiv) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was purified by flash column chromatography on silica gel (EtOAc/Hex = 95:5), providing **3l** as a pale yellow oil (73 mg, yield = 85%).

R_f = 0.28 (EtOAc/Hex = 9:1).

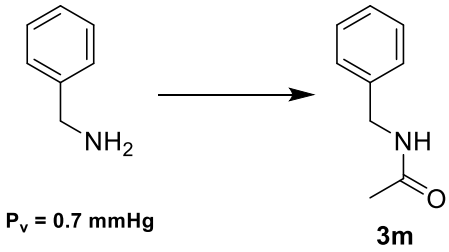
IR (neat):1651, 1561, 1465, 1367 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 5.83 (brs, 1H), 3.19 (q_{app}, *J* = 7.2 Hz, 2H), 1.94 (s, 3H), 1.45 (m, 2H), 1.35 – 1.12 (m, 14H), 0.84 (t, *J* = 6.8 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 170.2, 39.8, 32.0, 29.7 (2C), 29.6, 29.4, 29.3, 27.0, 23.3, 22.7, 14.2.

GC/MS – EI**:** *m/z* 199 (M^+, 18), 184 (16), 170 (8), 156 (15), 142 (14), 128 (17), 114 (39), 100 (43), 86 (48), 73 (100), 71 (90), 60 (31), 43 (52).

***N*-Acetylbenzylamine[1] (3m)**



P_v = 0.7 mmHg

3m

Chemical Formula: $C_9H_{11}NO$
Molecular Weight: 149.19

Compound **3m** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of benzylamine (46 mg, 0.43 mmol) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was purified by flash column chromatography on silica gel (EtOAc/Hex = 35/65), providing **3m** as a white solid (48 mg, yield = 75%).

R_f = 0.35 (EtOAc/Hex = 4:6).

m.p. : 62 – 64 °C

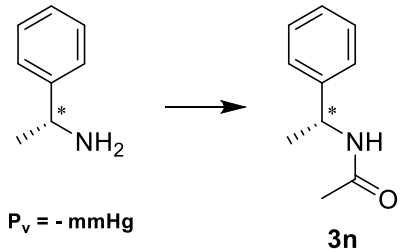
IR (film): 1644, 1549, 1495, 1453, 1428, 1373, 1358, 1289, 1077, 1028 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.38 – 7.21 (m, 5H), 6.07 (brs, 1H), 4.40 (d, *J* = 5.7 Hz, 2H), 2.00 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 170.1, 138.4, 128.8 (2C), 128.0 (2C), 127.6, 43.8, 23.3.

GC/MS - EI**:** *m/z* 149 (M^+, 70), 106 (100), 91 (33), 79 (15), 77 (16), 65 (8), 51 (9), 43 (19).

***N*-Acetyl-(*R*)-phenylethylamine[1,8] (3n)**



P_v = - mmHg

3n

Chemical Formula: $C_{10}H_{13}NO$
Molecular Weight: 163.22

Compound **3n** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of optically active (*R*)-phenylethylamine (52 mg, 0.43 mmol) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was purified by flash column chromatography on silica gel (EtOAc/Hex = 35/65) which provided **3n** as a white solid (63 mg, yield =90%).

R_f = 0.35 (EtOAc/Hex 4:6).

$[\alpha]^{25}_D$ +133. (*c*. 1.00, $CHCl_3$)

m.p. = 98 – 100 °C

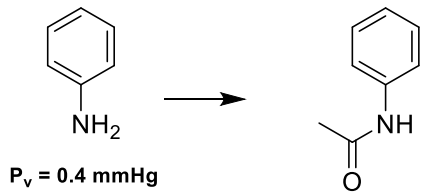
IR (film): 1637, 1541, 1493, 1448, 1371, 1300, 1281, 1209, 1133, 1025, 996, 960 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.39 – 7.24 (m, 5H), 6.22 (brs, 1H), 5.11 (p_{app}, *J* = 7.2 Hz, 1H), 1.96 (s, 3H), 1.48 (d, *J* = 6.9 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 169.3, 143.4, 128.7 (2C), 127.4, 126.3 (2C), 48.8, 23.4, 21.8.

GC/MS - EI**:** *m/z* 163 (M^+, 47), 148 (21), 120 (34), 106 (100), 105 (30), 77 (21), 43 (14).

***N*-Acetylaniline[1] (3o)**



3o

Chemical Formula: C_8H_9NO
Molecular Weight: 135.17

Compound **3o** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of aniline (40 mg, 0.43 mmol) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, providing product **3o** as a white solid (52 mg, yield =90%).

IR (film): 1659, 1619, 1595, 1550, 1499, 1487, 1444, 1366, 1320, 1271, 1029, 966, 900 cm^{-1}.

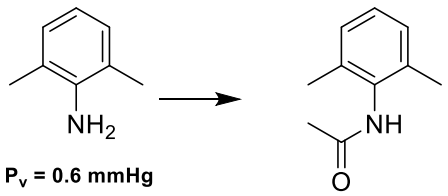
m.p. = 113 – 115 °C

^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.56 (brs, 1H), 7.50 (d, *J* = 7.7 Hz, 2H), 7.30 (t, *J* = 7.9 Hz, 2H), 7.10 (t, *J* = 7.4 Hz, 1H), 2.16 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 168.6, 138.0, 129.1 (2C), 124.4, 120.0 (2C), 24.7.

GC/MS - EI**:** *m/z* 135 (M^+, 33), 93 (100), 66 (12), 43 (11).

***N*-Acetyl, 2,6-dimethylaniline[9] (3p)**



P_v = 0.6 mmHg

3p

Chemical Formula: $C_{10}H_{13}NO$
Molecular Weight: 163.22

Compound **3p** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of 2,6-dimethylaniline (52 mg, 0.43 mmol, 1.0 equiv) in *t*-butyl acetate (4.3 mL). *t*-Butyl acetate was evaporated under reduced pressure, and then the residue was purified by flash column chromatography on silica gel (EtOAc/Hex = 80/20) which provided **3p** as a white solid (63 mg, yield =90%). Two isomers are present in a ratio = 70:30

R_f = 0.35 (EtOAc/Hex = 80/20)

m.p. = 181 – 183 °C

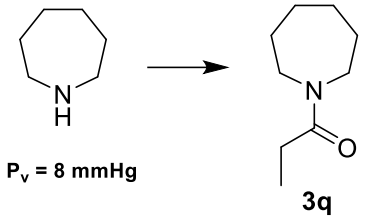
IR (film): 1646, 1600, 1590, 1537, 1472, 1441, 1371, 1301, 1287, 1210, 1164, 1097, 1041, 1013, 972, 963 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): **Major isomer** δ = 7.2 – 7.05 (m, 3H), 6.78 (brs, 1H), 2.23 (s, 6H), 2.20 (s, 3H). **Minor isomer** δ = 7.2 – 7.05 (m, 3H), 6.71 (brs, 1H), 2.27 (s, 6H), 1.75 (s, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): **Major isomer** δ = 168.7, 135.7, 134.0, 178.7, 128.3 (2C), 127.6, 23.3, 18.5(2C). **Minor isomer** δ = 173.2, 136.8, 135.2, 128.4, 128.3 (2C), 127.6, 19.9, 18.6 (2C).

GC/MS - EI**:** *m/z* 163 (M^+, 60), 148 (4), 121 (100), 120 (50), 106 (50), 91 (14), 77 (14), 65 (5), 43 (13).

***N*-Azepanepropionamide[10] (3q)**



Chemical Formula: $C_9H_{17}NO$
Molecular Weight: 155.24

Compound **3q** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of azepane (42 mg, 0.42 mmol) in *t*-butyl propionate (4.2 mL). *t*-Butyl propionate was evaporated under reduced pressure, and then the separation was carried by flash column chromatography on silica gel (EtOAc/Hex = 6:4), providing **3q** as a yellowish oil (52 mg, yield = 80%).

R_f = 0.26 (EtOAc/Hex 5:5).

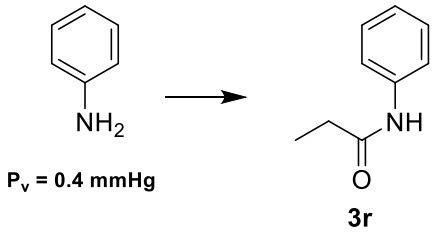
IR (neat): 1730, 1633, 1461, 1424, 1373, 1356, 1291, 1262, 1193, 1169, 1101, 1074, 1022, 998, 972, 907 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 3.50 (t_{app}, *J* = 6 Hz, 2H), 3.40 (t_{app}, *J* = 6 Hz, 2H), 2.32 (q, *J* = 7.6 Hz, 2H), 1.73 – 1.63 (m, 4H), 1.58 – 1.47 (m, 4H), 1.12 (t, *J* = 7.2 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 173.7, 47.9, 46.1, 29.2, 27.7, 27.2, 27.0, 26.5, 9.7.

GC/MS - EI**:** *m/z* 155 (M^+, 55), 140 (21), 129 (31), 126 (25), 113 (16), 98 (37), 84 (58), 70 (45), 57 (100), 41 (24).

***N*-Phenylpropionamide[11] (3r)**



P_v = 0.4 mmHg

3r

Chemical Formula: $C_9H_{11}NO$
Molecular Weight: 149.19

Compound **3r** was prepared according to the general procedure **GP1.** The reaction was performed with a solution of aniline (52 mg, 0.43 mmol) in *t*-butyl propionate (4.3 mL). *t*-Butyl propionate was evaporated under reduced pressure, and then the separation was carried by flash column chromatography on silica gel (EtOAc/Hex = 4:6), providing **3r** as a white solid (23 mg, yield =35%).

R_f = 0.32 (EtOAc/Hex = 4:6).

m. p. = 105 – 106 °C

IR (film): 1660, 1597, 1539, 1497, 1461, 1440, 1366, 1305, 1244, 1200, 1176, 1155, 1072, 1030, 920 cm^{-1}.

^{1}H NMR (400 MHz, $CDCl_3$): δ = 7.62 (brs, 1H), 7.52 (d, *J* = 7.9 Hz, 2H), 7.29 (t, *J* = 7.9 Hz, 2H), 7.08 (t, *J* = 7.4 Hz, 1H), 2.38 (q, *J* = 7.6 Hz, 2H), 1.22 (t, *J* = 7.6 Hz, 3H).

^{13}C NMR (101 MHz, $CDCl_3$): δ = 172.4, 138.0, 129.1 (2C), 124.4, 120.0 (2C), 30.8, 9.8.

GC/MS - EI**:** *m/z* 149 (M^+, 25), 93 (100), 77 (6), 65 (8), 57 (9), 39 (4).

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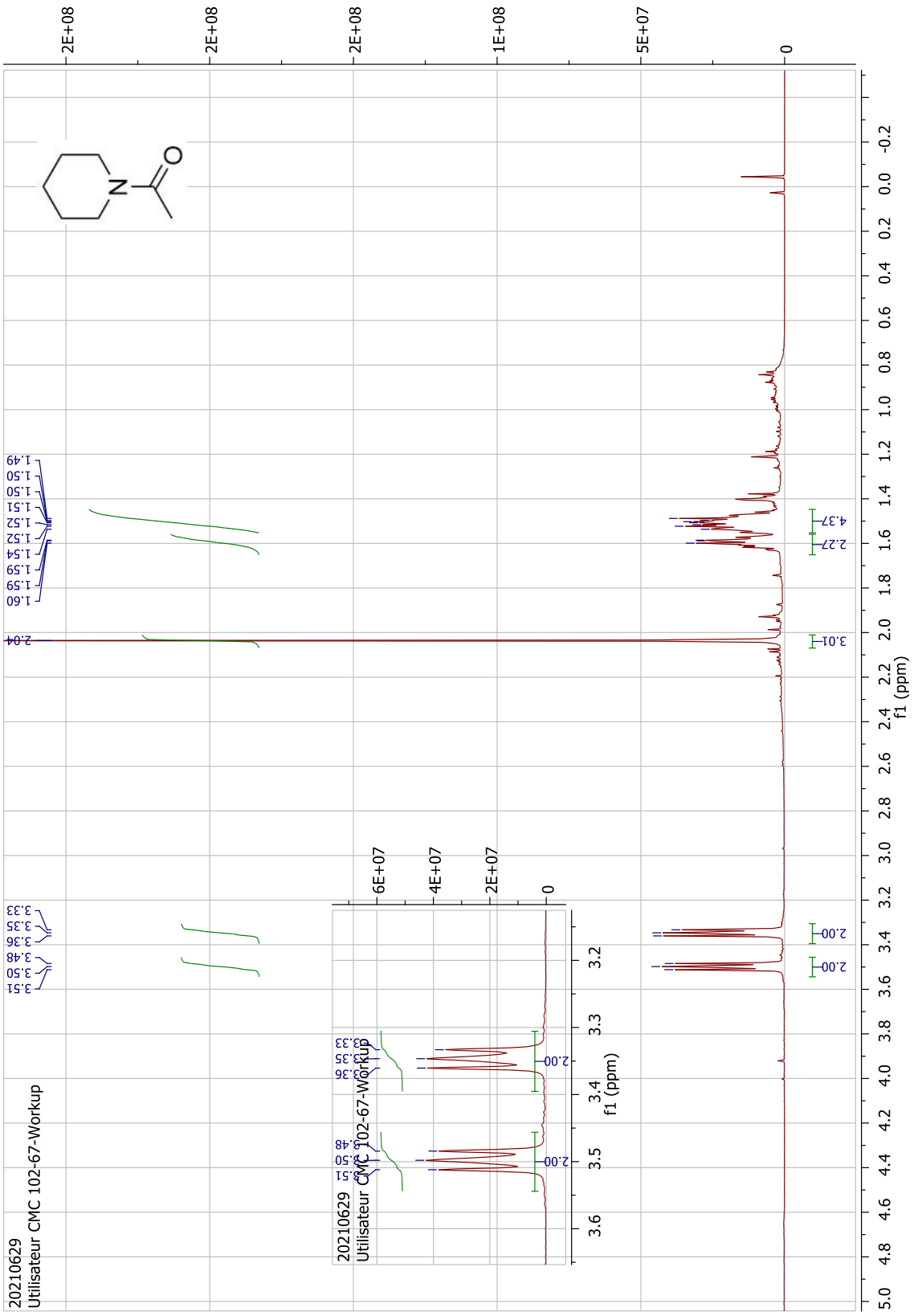
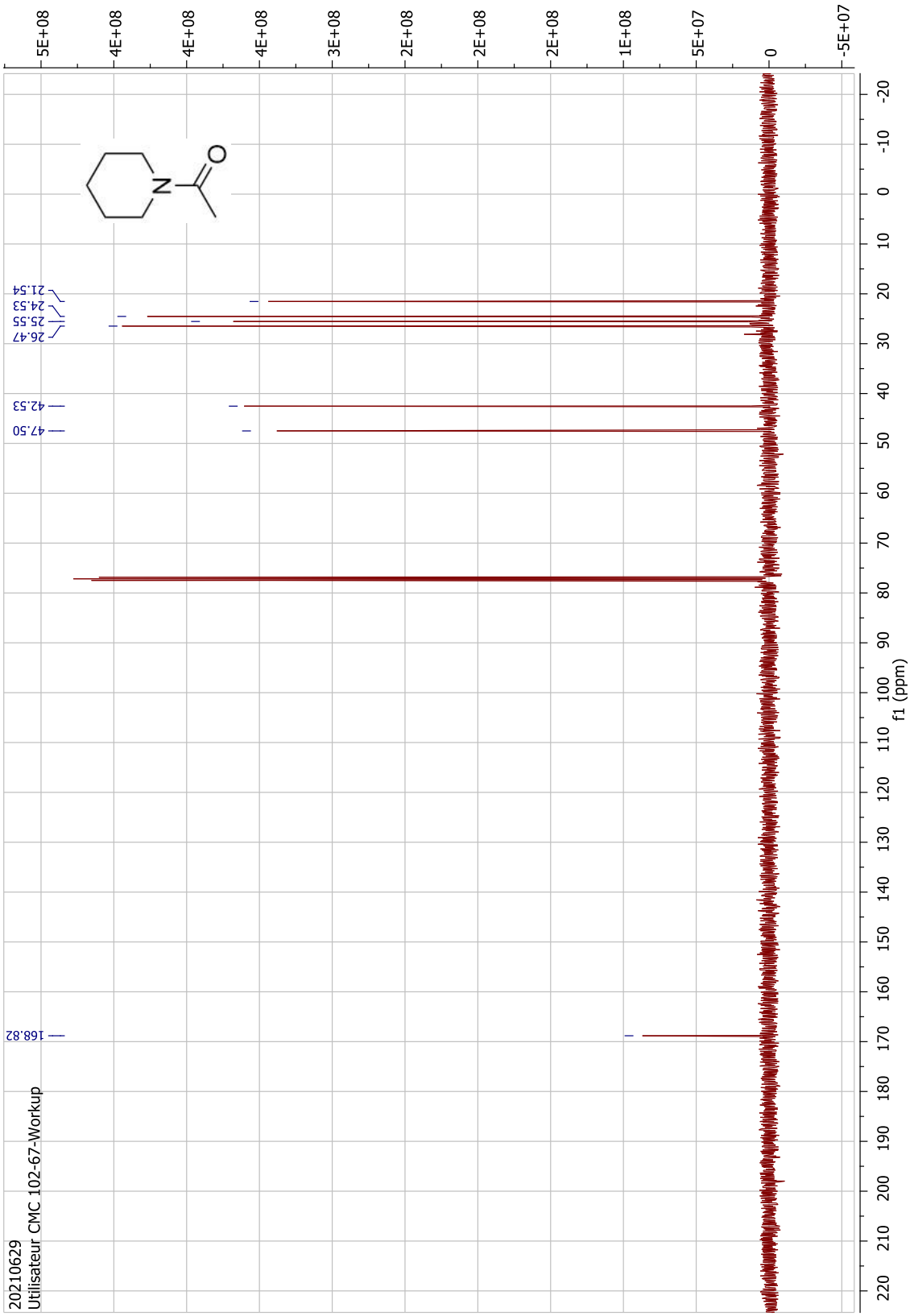
Copies Of ^{1}H and ^{13}C NMR SPECTRA (spectroscopic data)

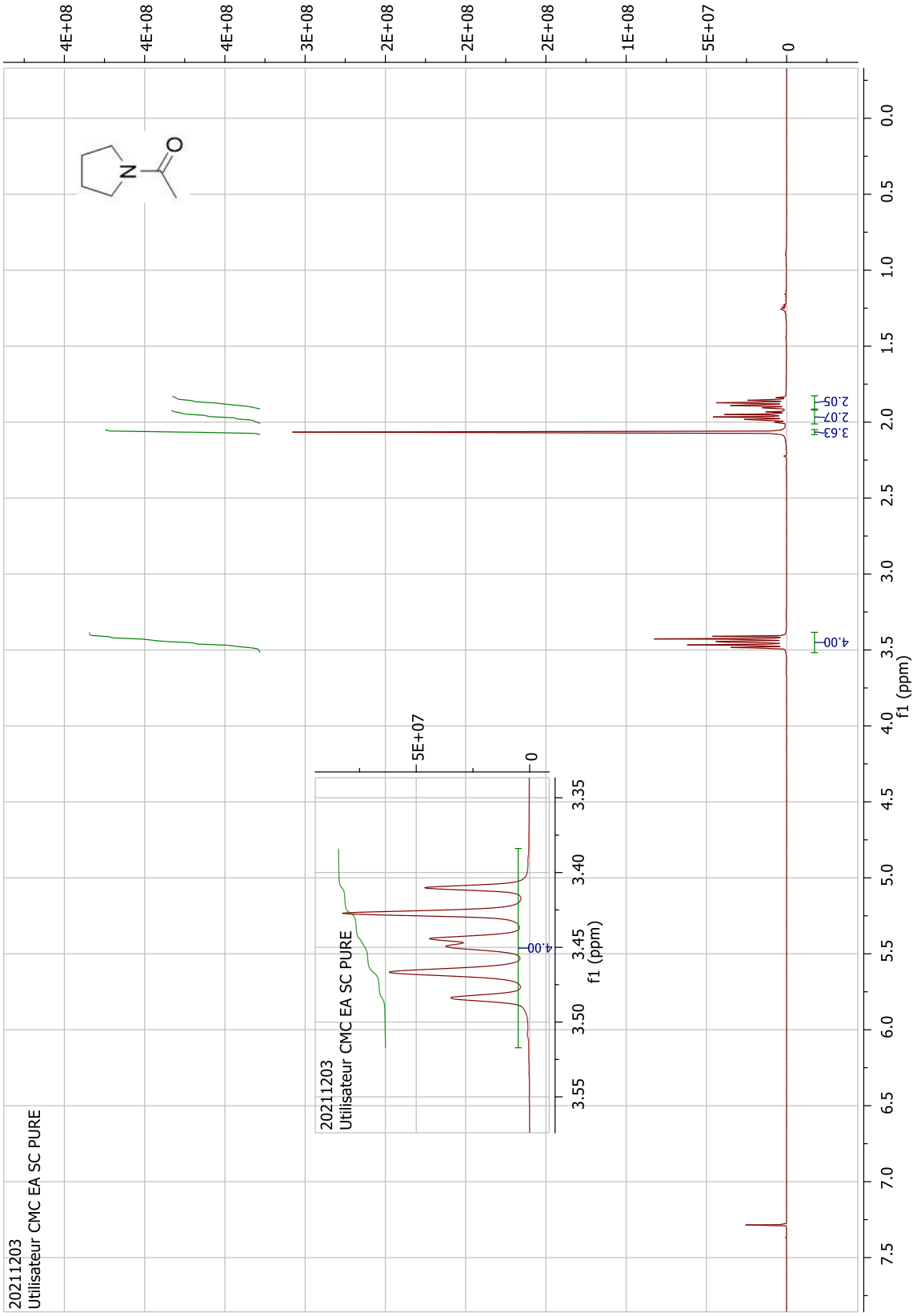
N-Acetylpiperidine[1] (3a) ^{1}H NMR



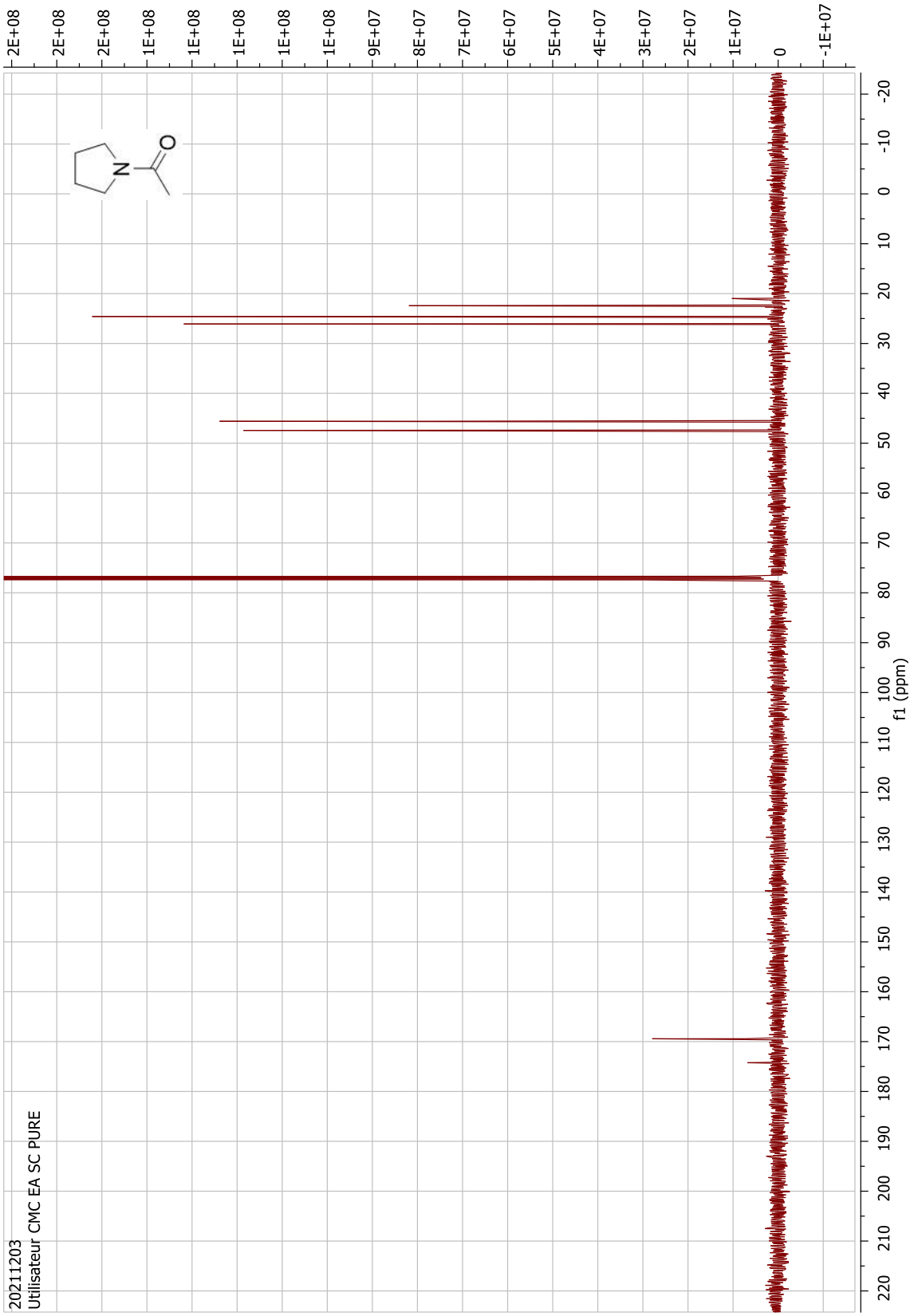
N-Acetylpiperidine[1] (3a) ^{13}C NMR



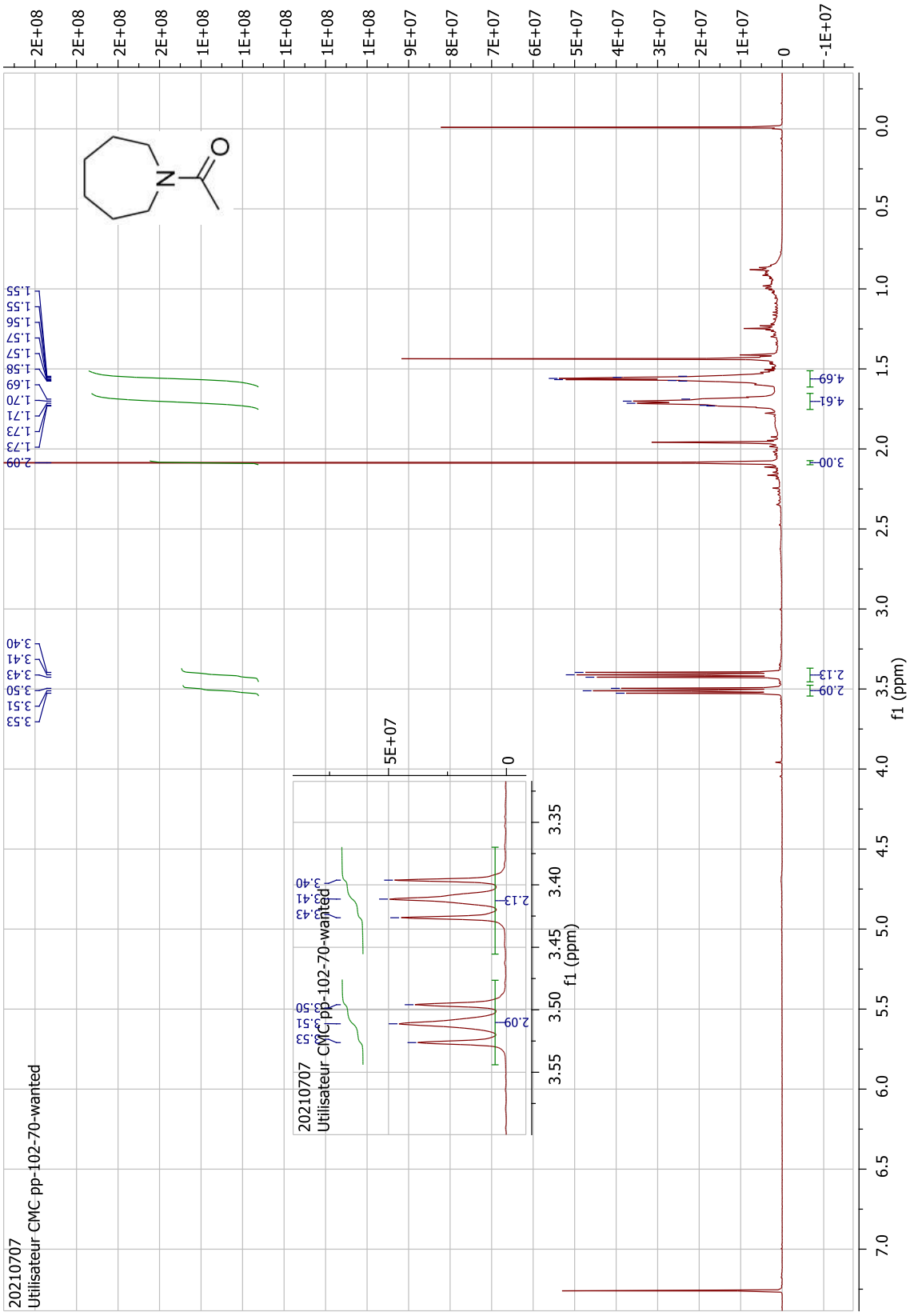
***N*-Acetylpyrrolidine[1] (3b) ^{1}H NMR**



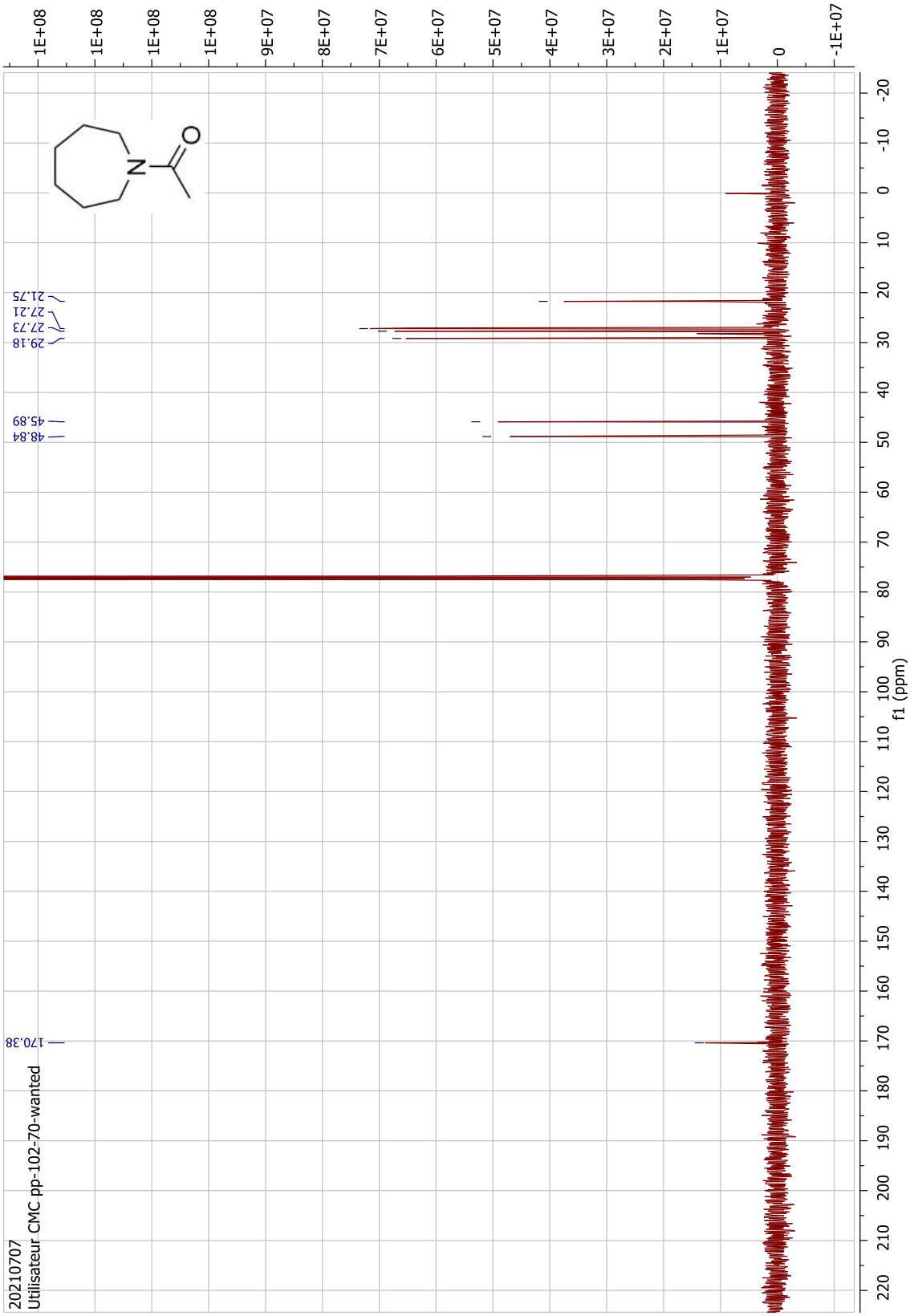
N-Acetylpyrrolidine[1] (3b) ^{13}C NMR



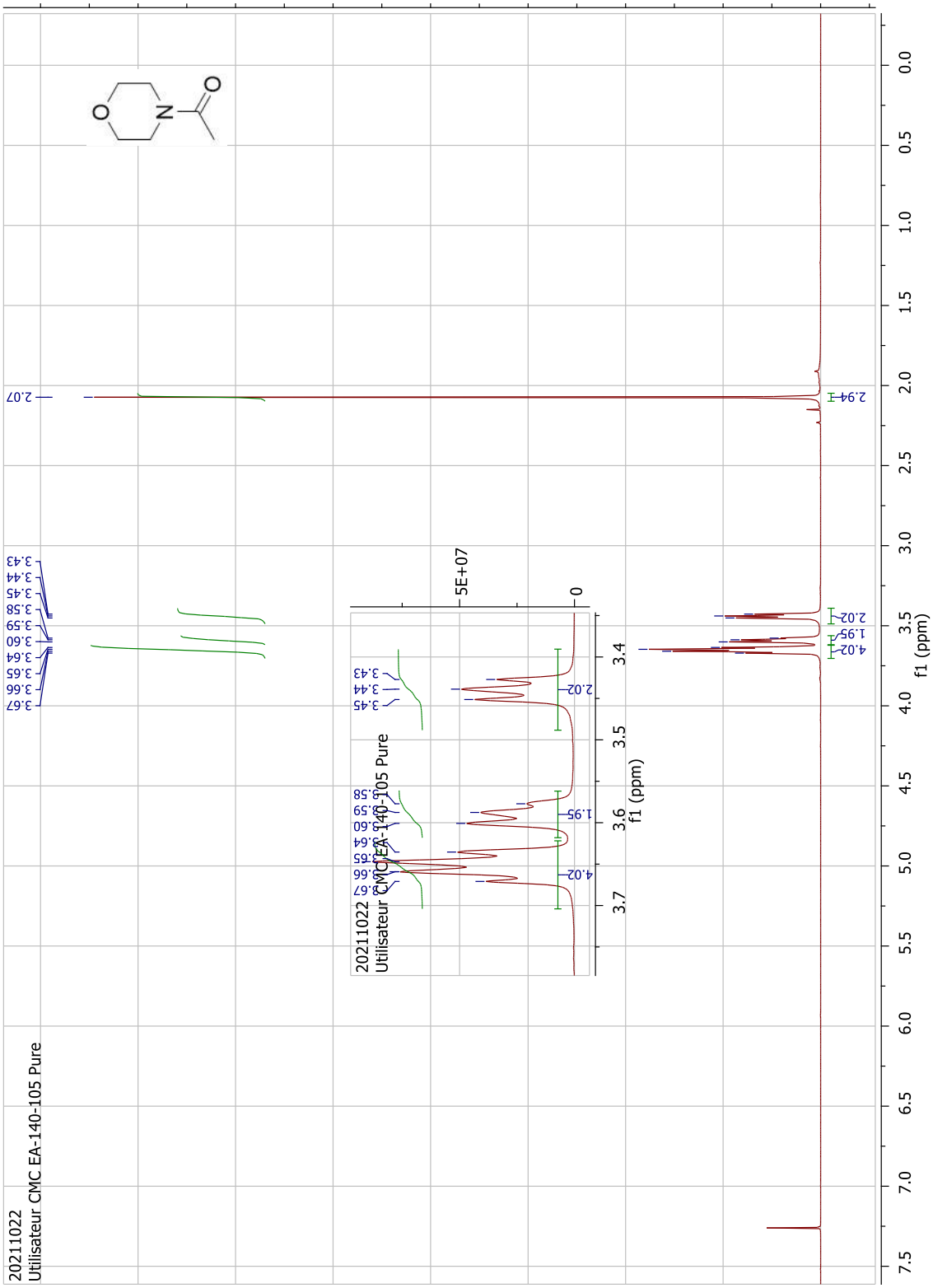
N-Acetylazepane[1] (3c) ^{1}H NMR



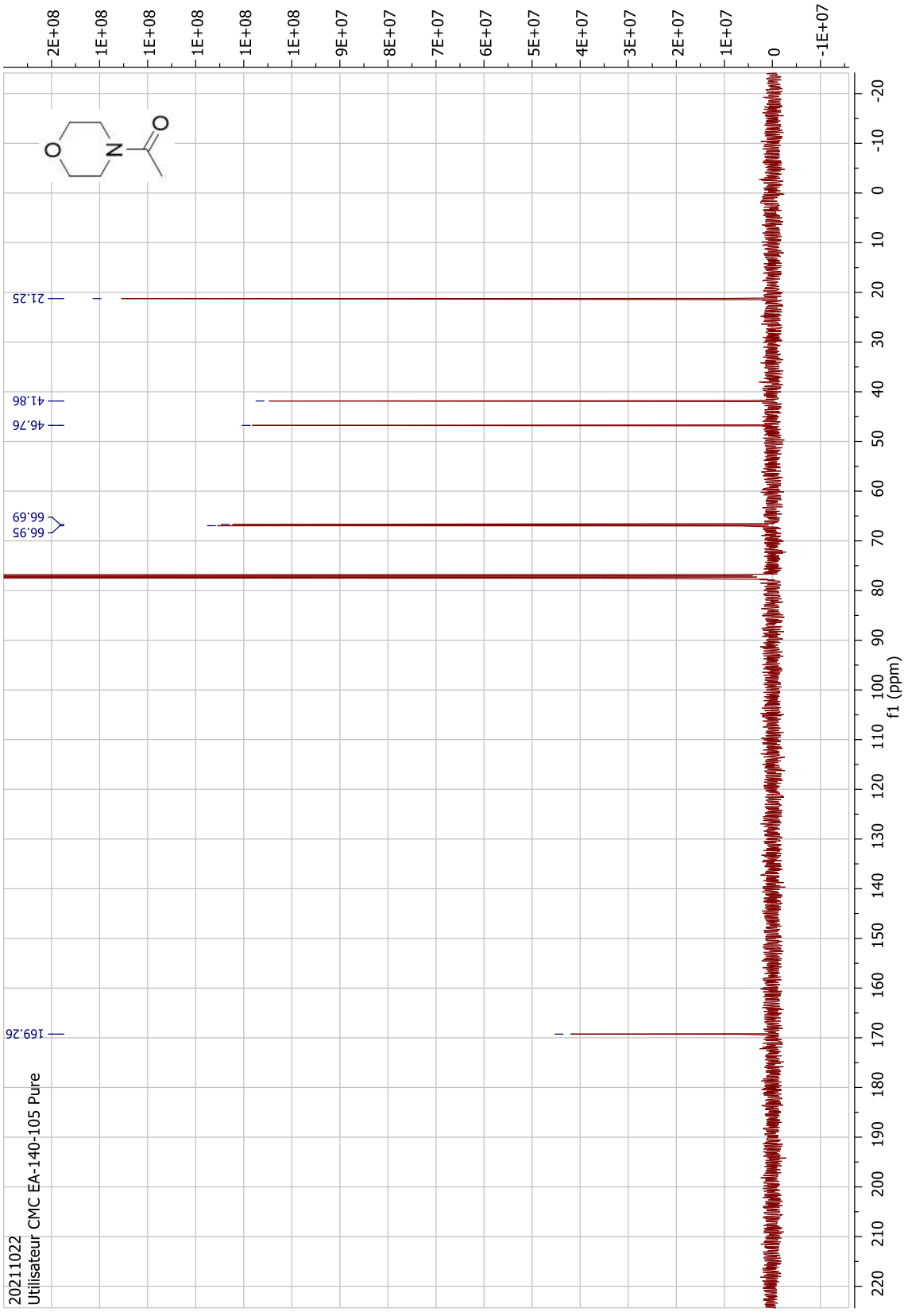
N-Acetylazepane[1] (3c) ^{13}C NMR



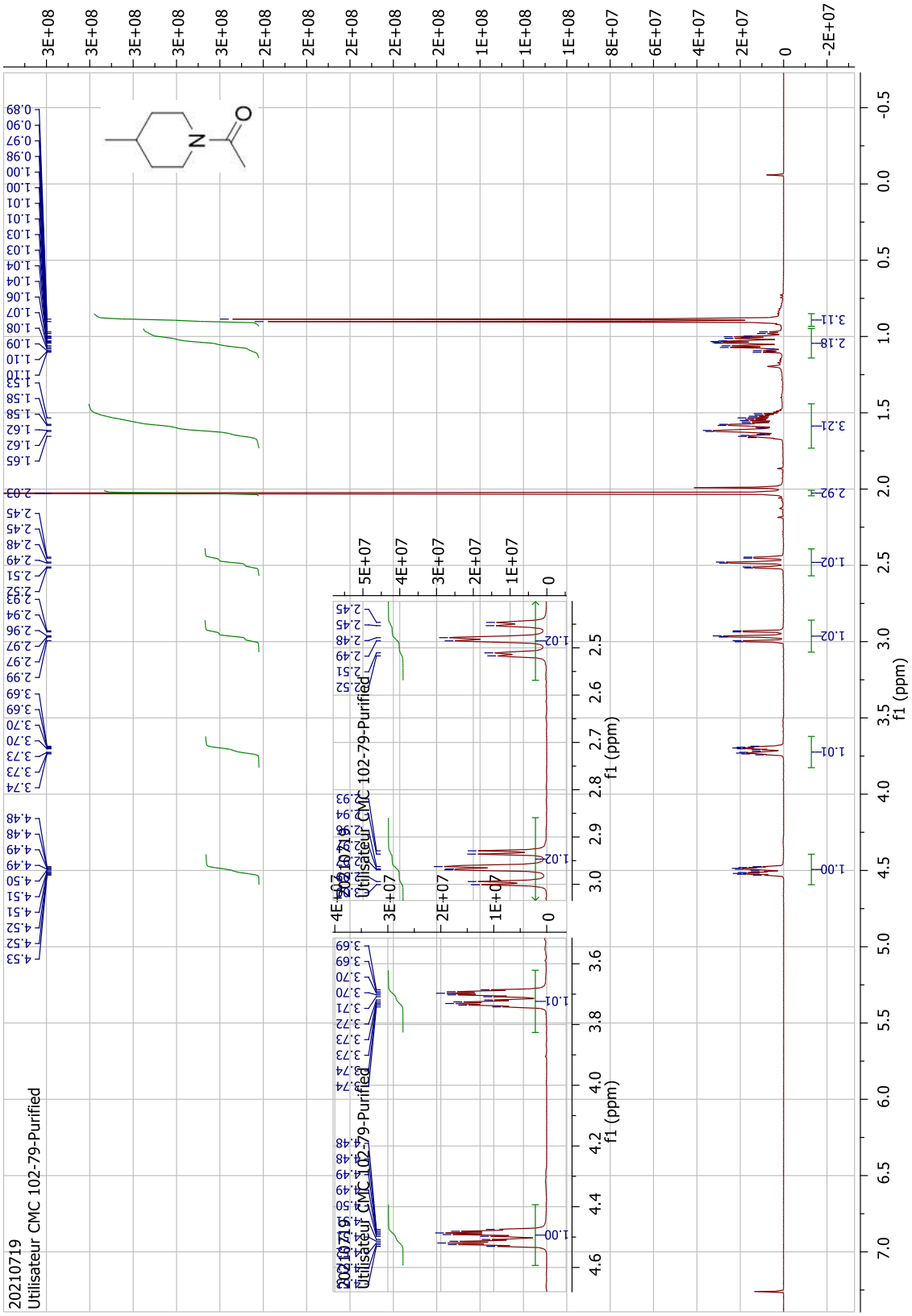
N-Acetylmorpholine[1] (3d) ^{1}H NMR



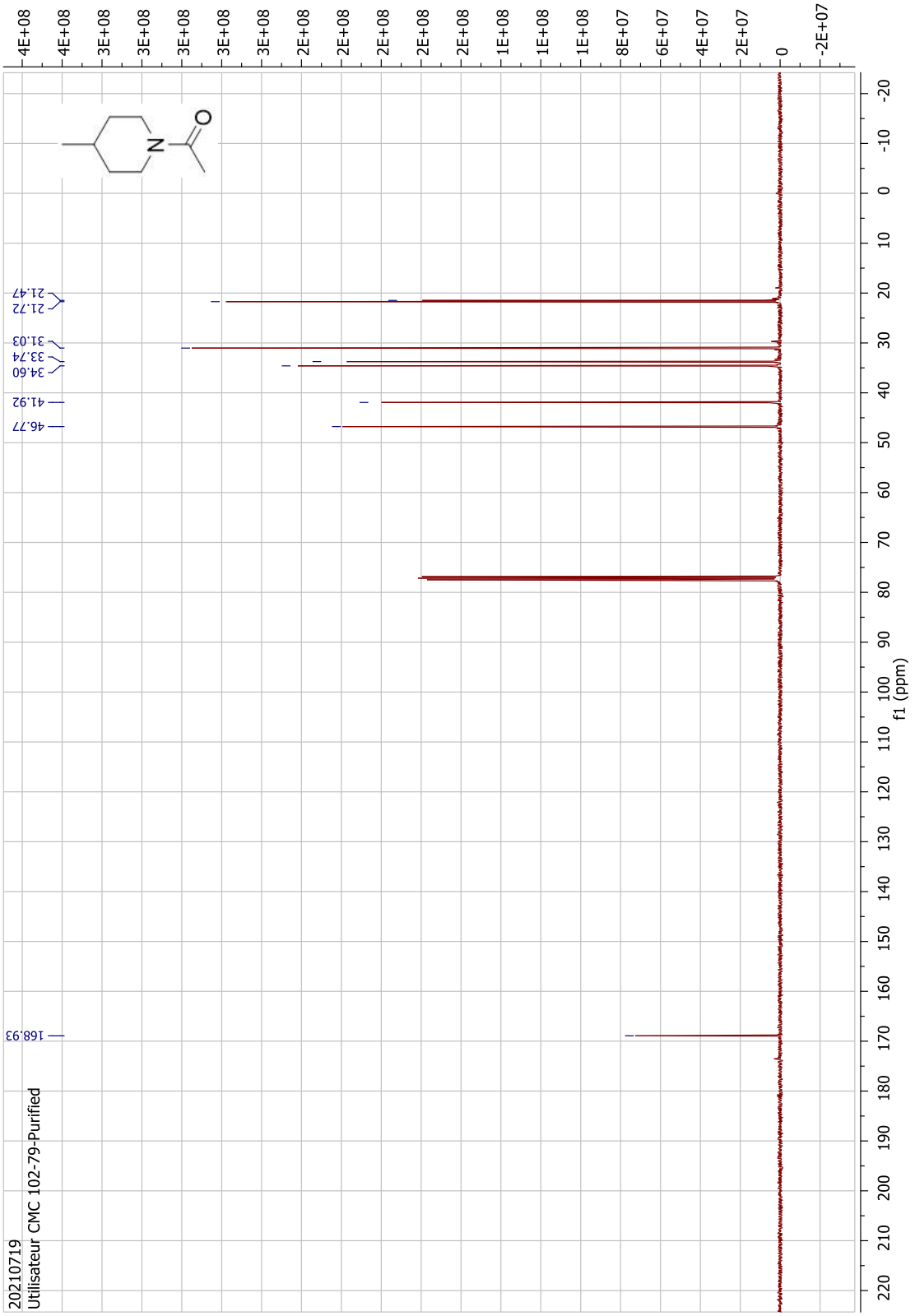
N-Acetylmorpholine[1] (3d) ^{13}C NMR



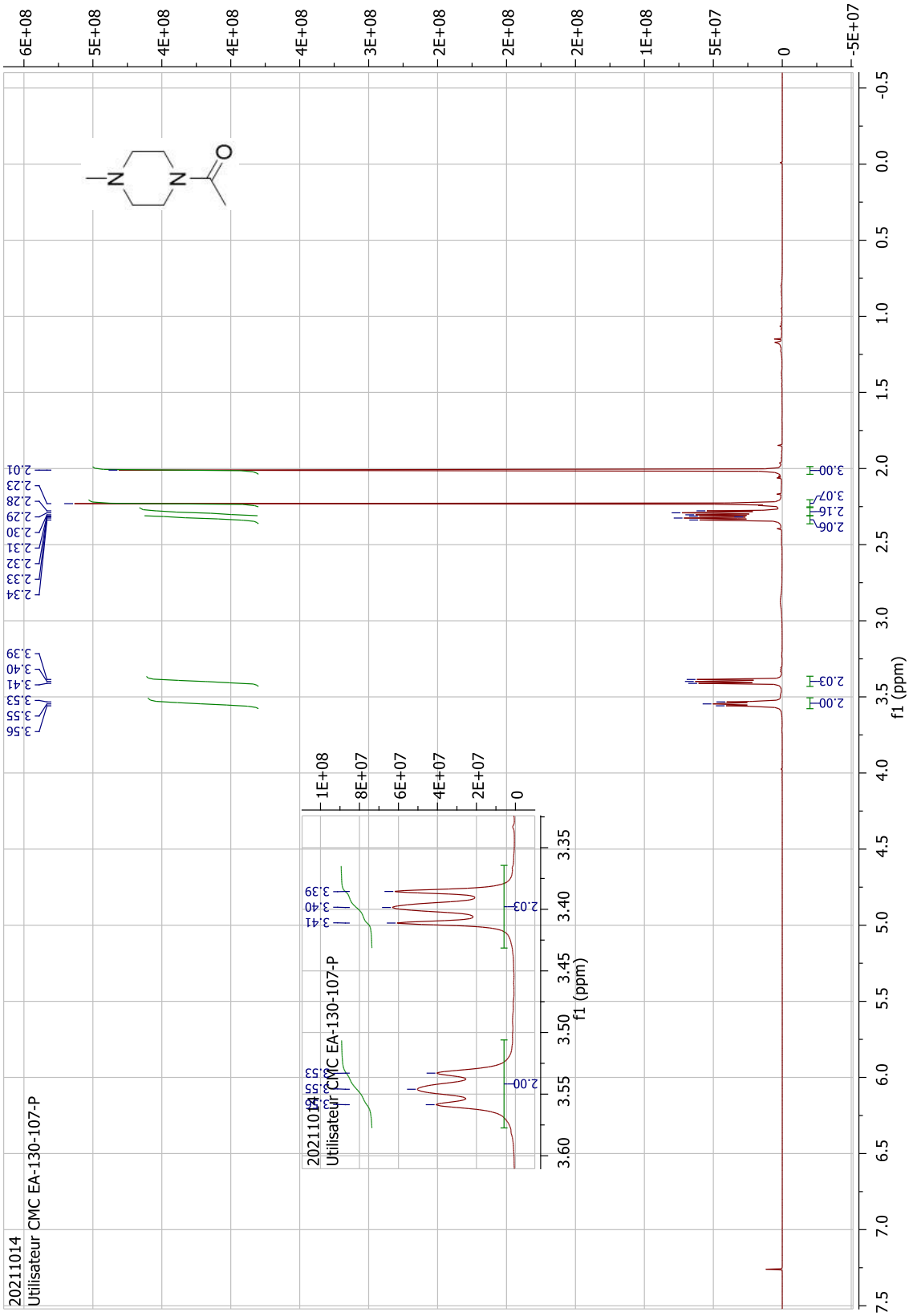
N-Acetyl-4-Methyl-piperidine[2] (3e) ^{1}H NMR



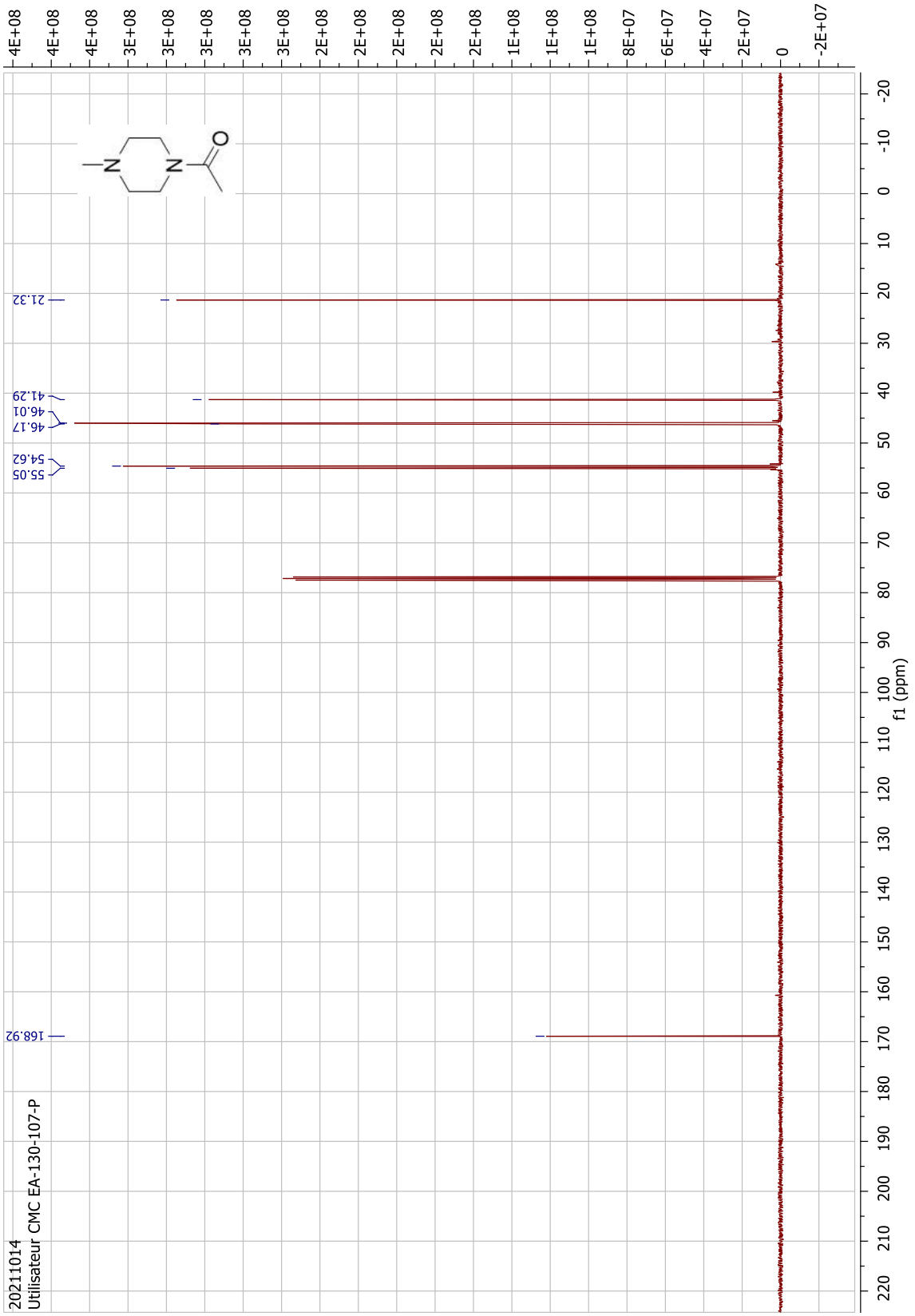
N-Acetyl-4-Methyl-piperidine[2] (3e) ^{13}C NMR



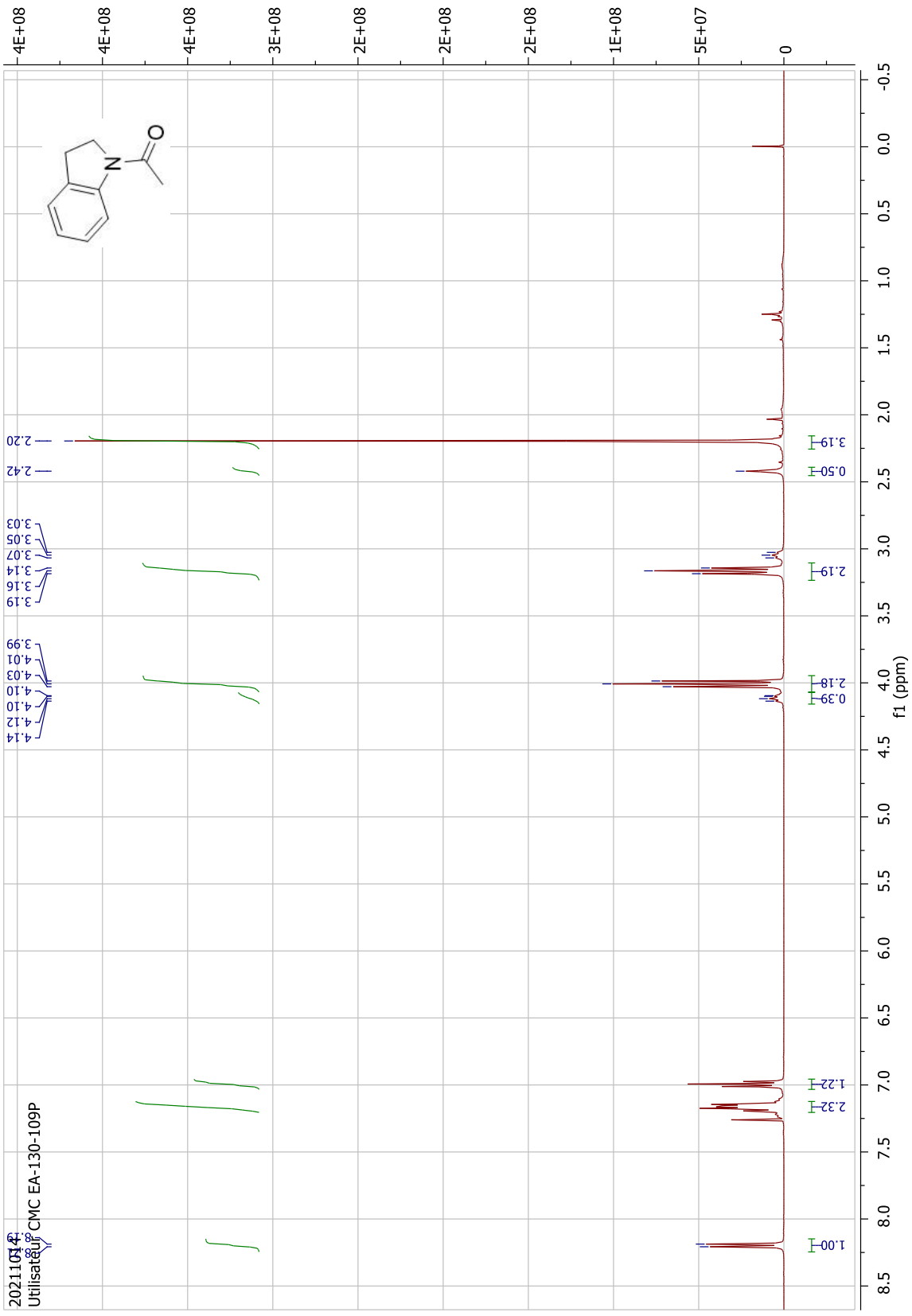
1-(*N*-Acetyl)-4-(*N'*-methyl)piperazine[3] (3f) ^{1}H NMR



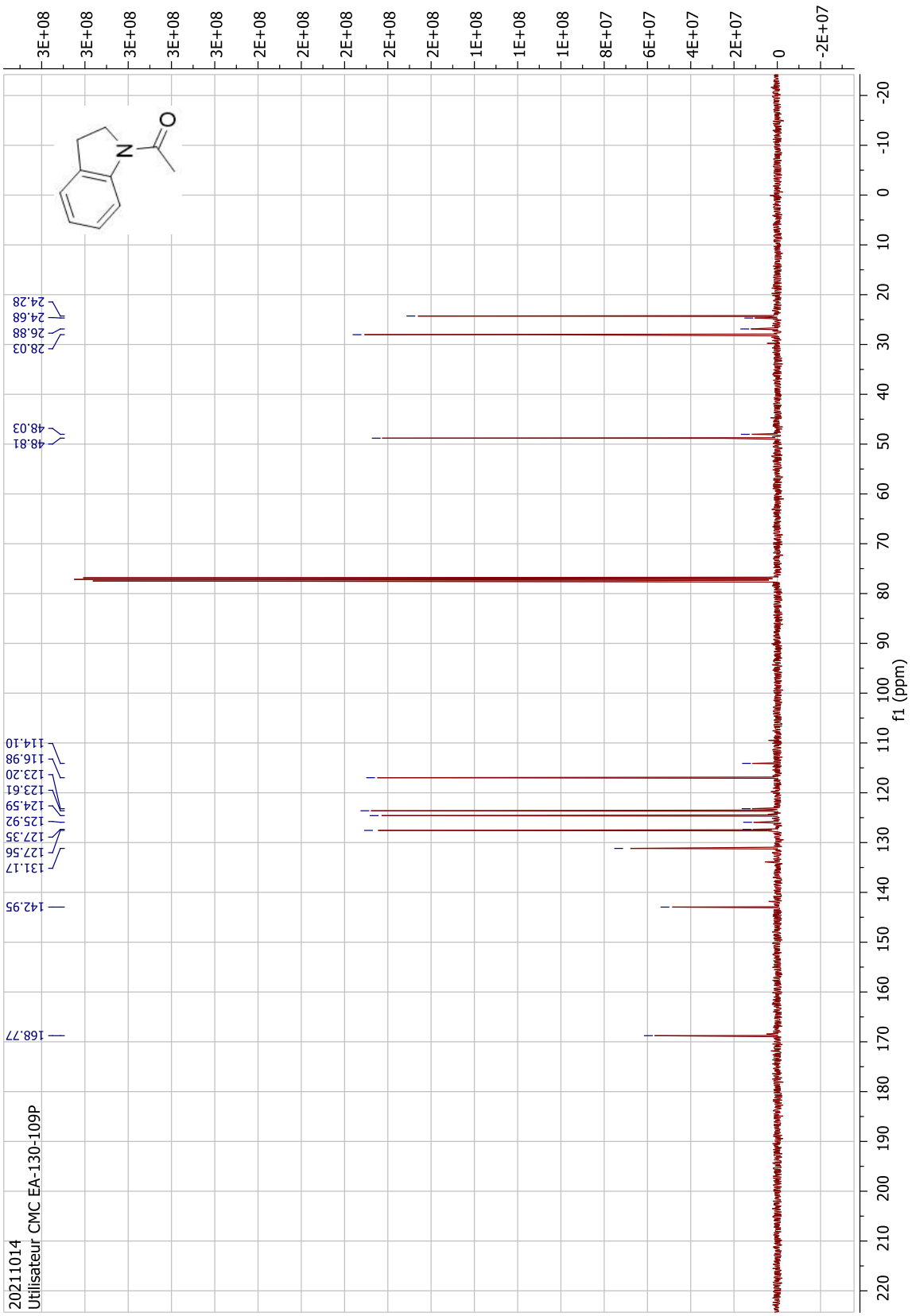
1-(*N*-Acetyl)-4-(*N'*-methyl)piperazine[3] (3f) ^{13}C NMR



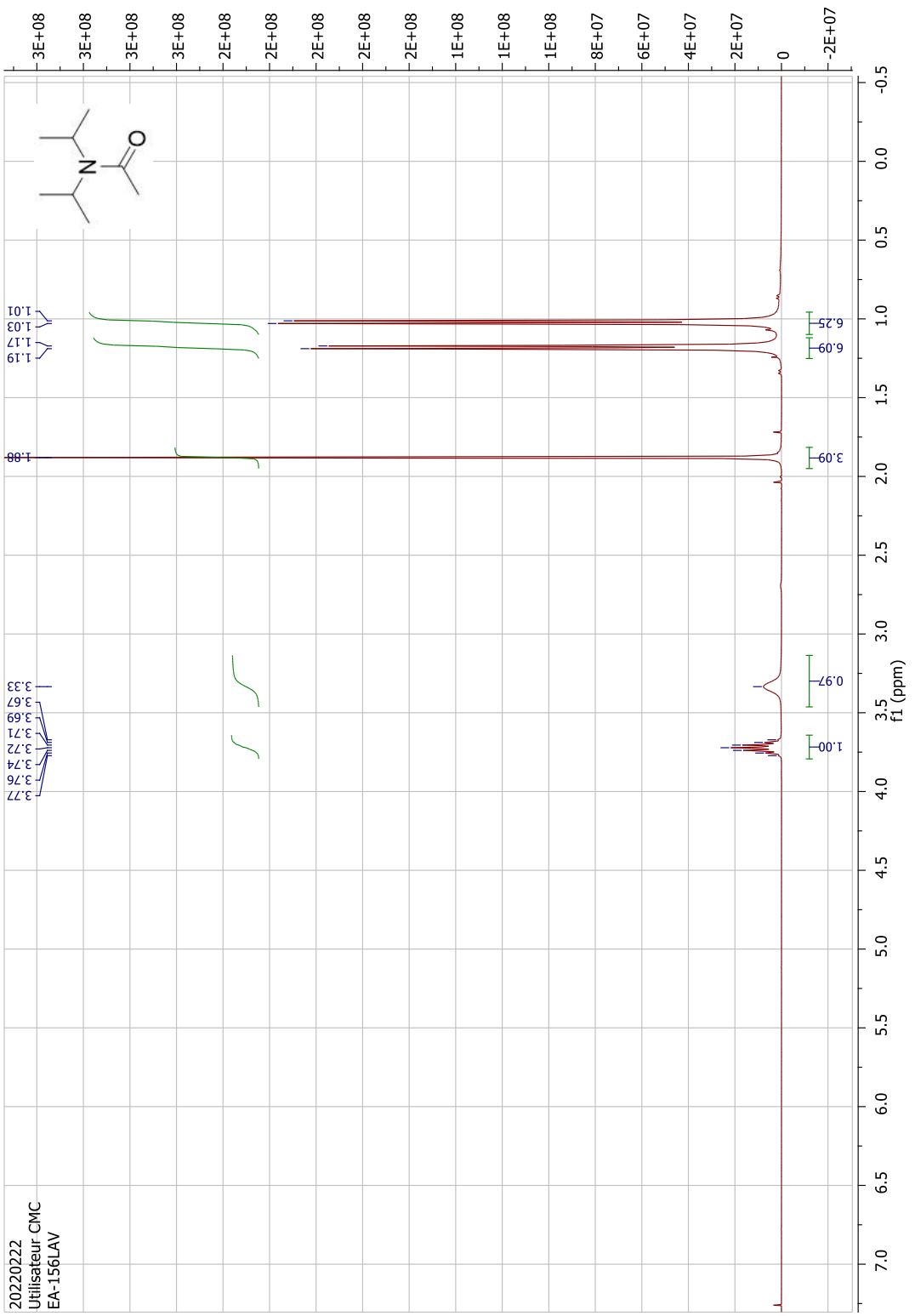
N-Acetylindoline[4,5] (3g) ^{1}H NMR



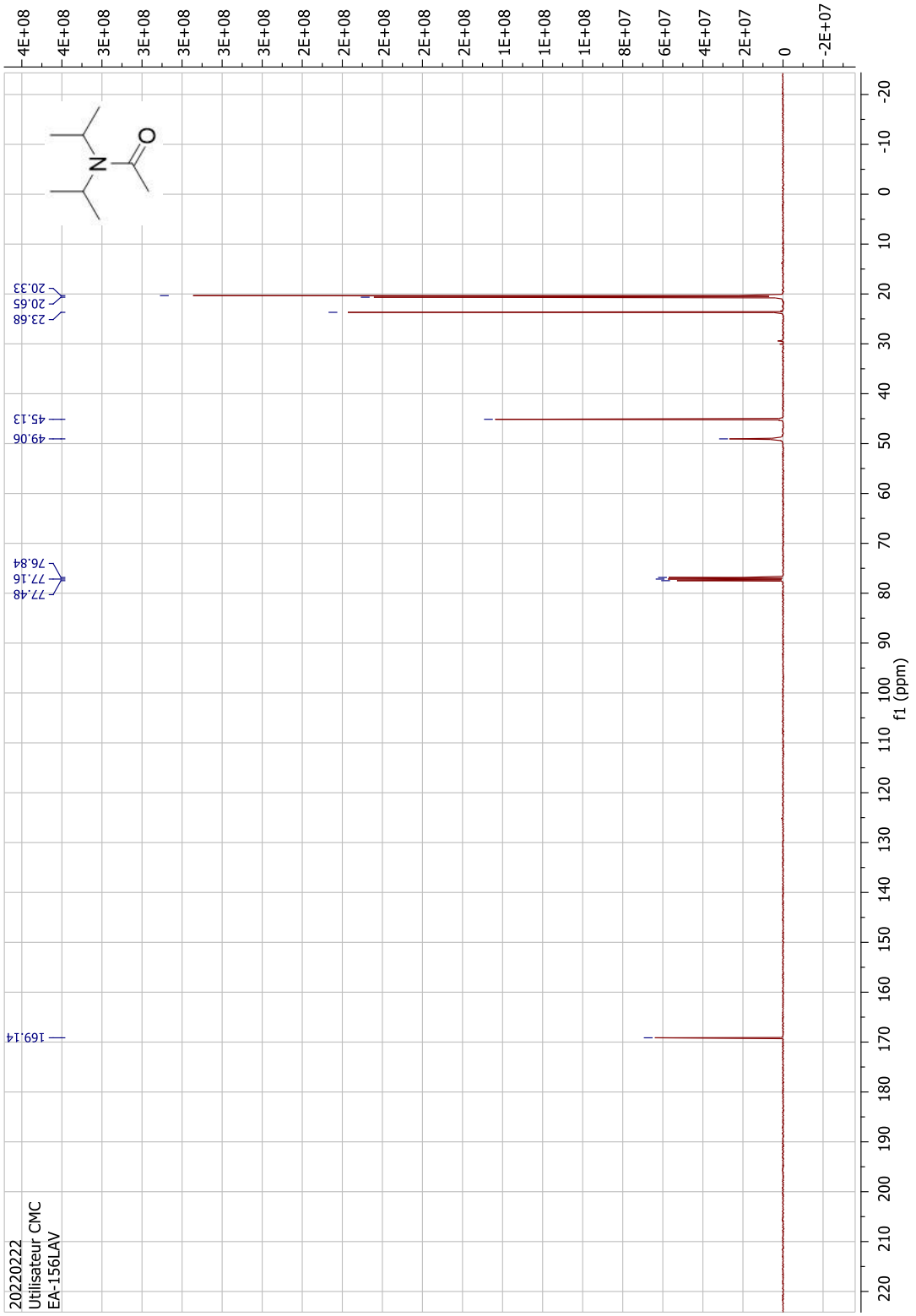
N-Acetylindoline[4,5] (3g) ^{13}C NMR



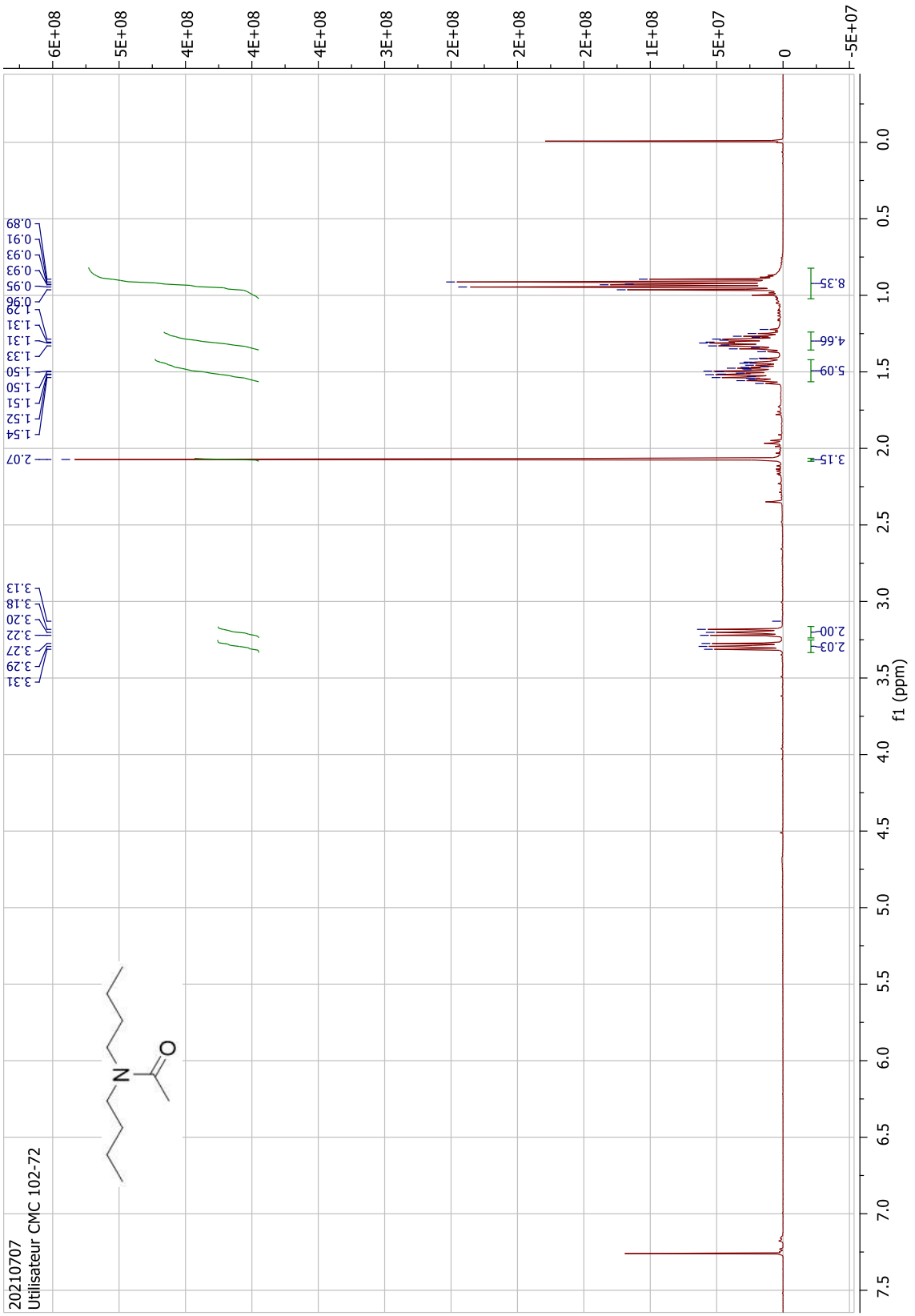
_N_-Acetyl, _N_,_N_-diisopropylamine[1] (3h) ^{1}H NMR



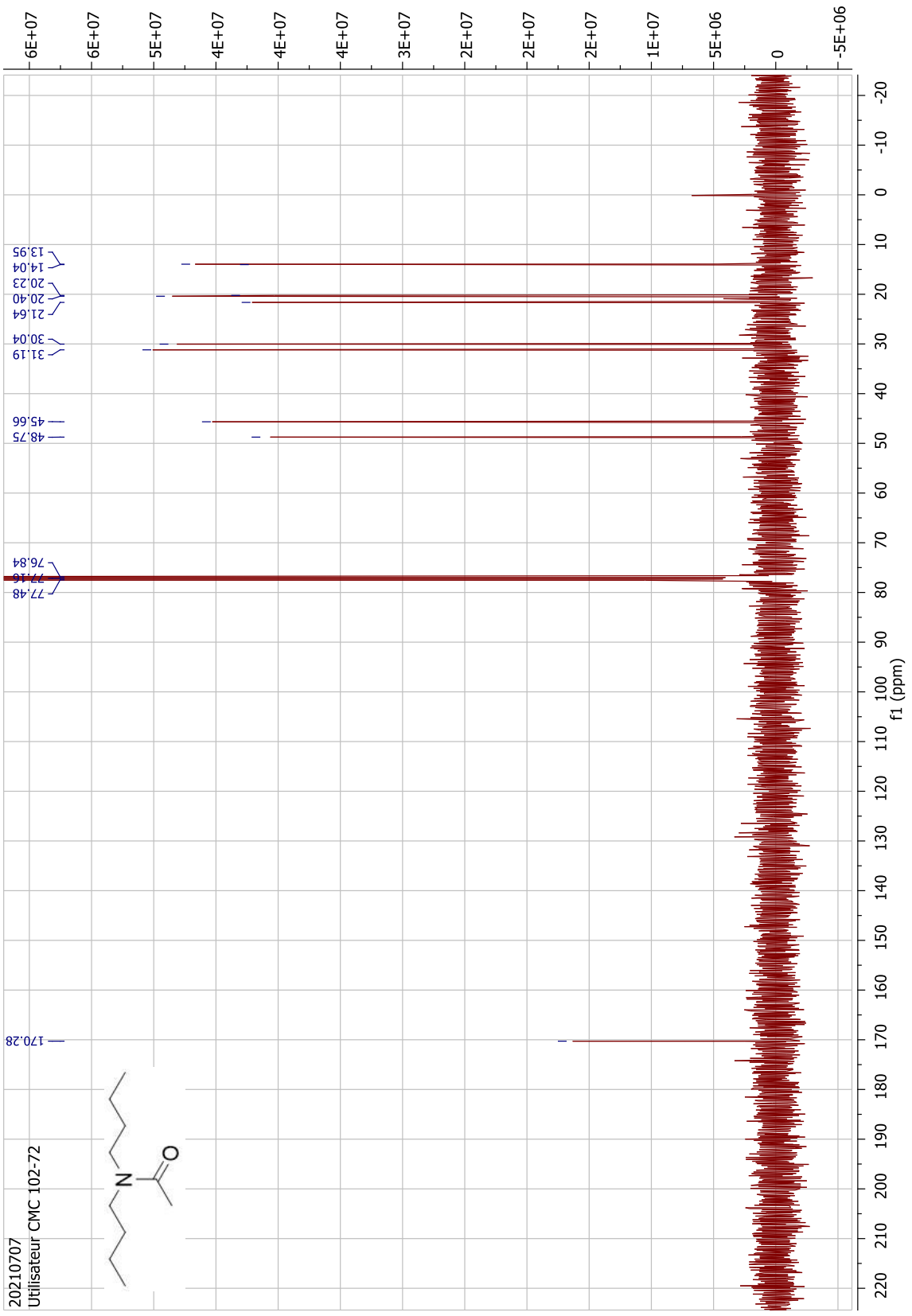
N-Acetyl, *N*,*N*-diisopropylamine[1] (3h) ^{13}C NMR



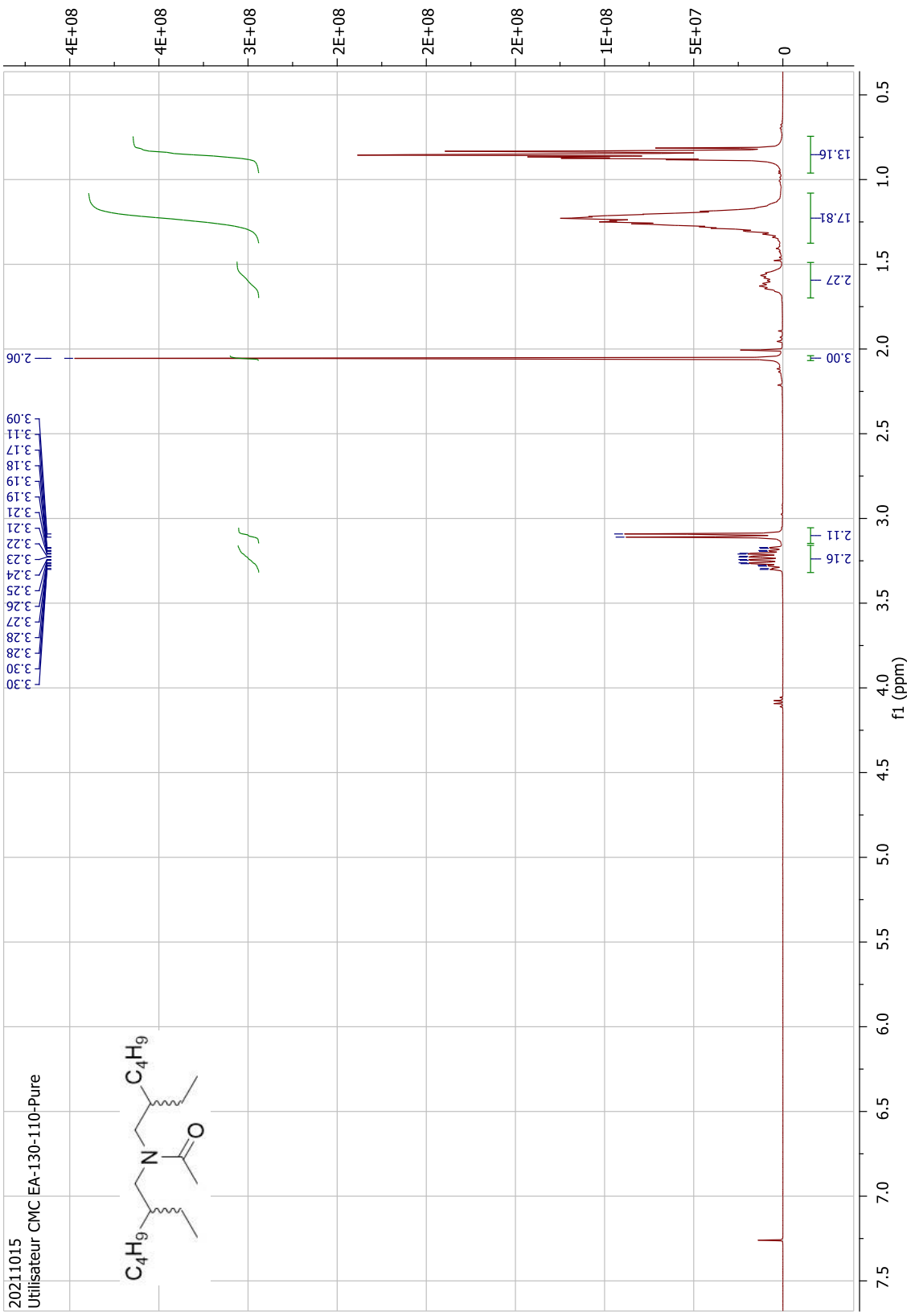
N-Acetyl, *N*,*N*-dibutylamine[6] (3i) ^{1}H NMR



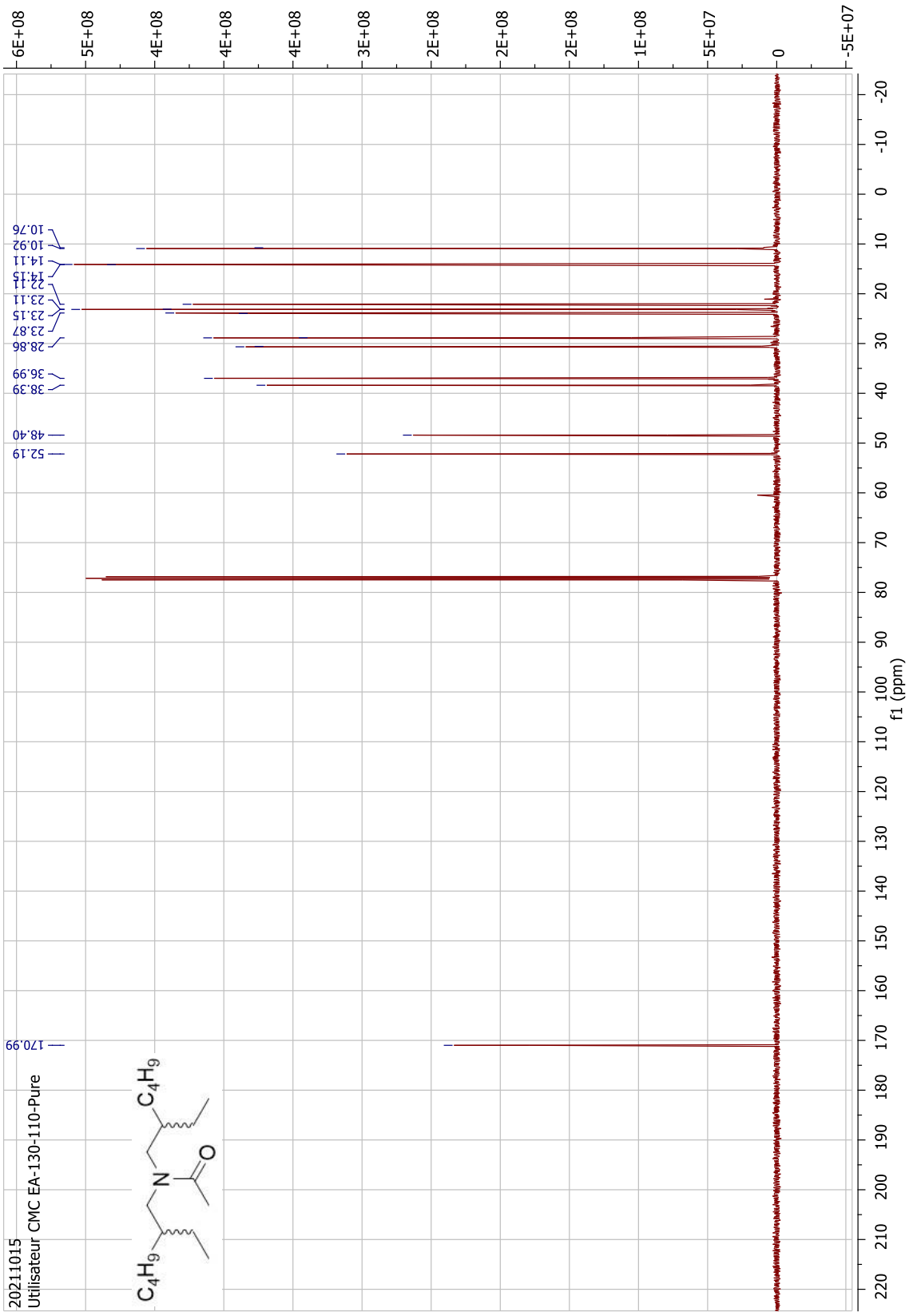
N-Acetyl, *N*,*N*-dibutylamine[6] (3i) ^{13}C NMR



N-Acetyl, *N*,*N*-diethylhexylamine (3j) ^{1}H NMR

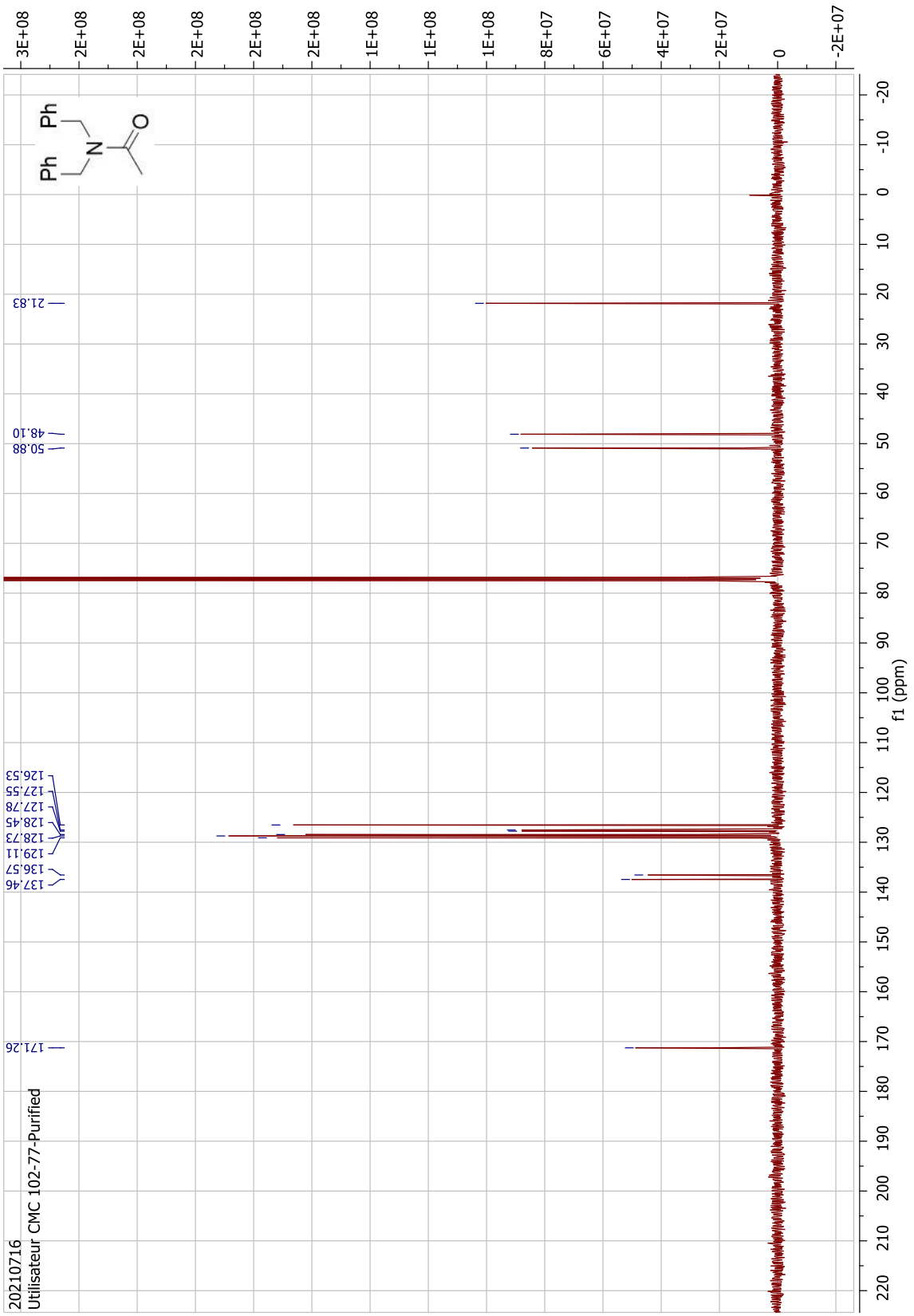


N-Acetyl, *N*,*N*-diethylhexylamine (3j) ^{13}C NMR

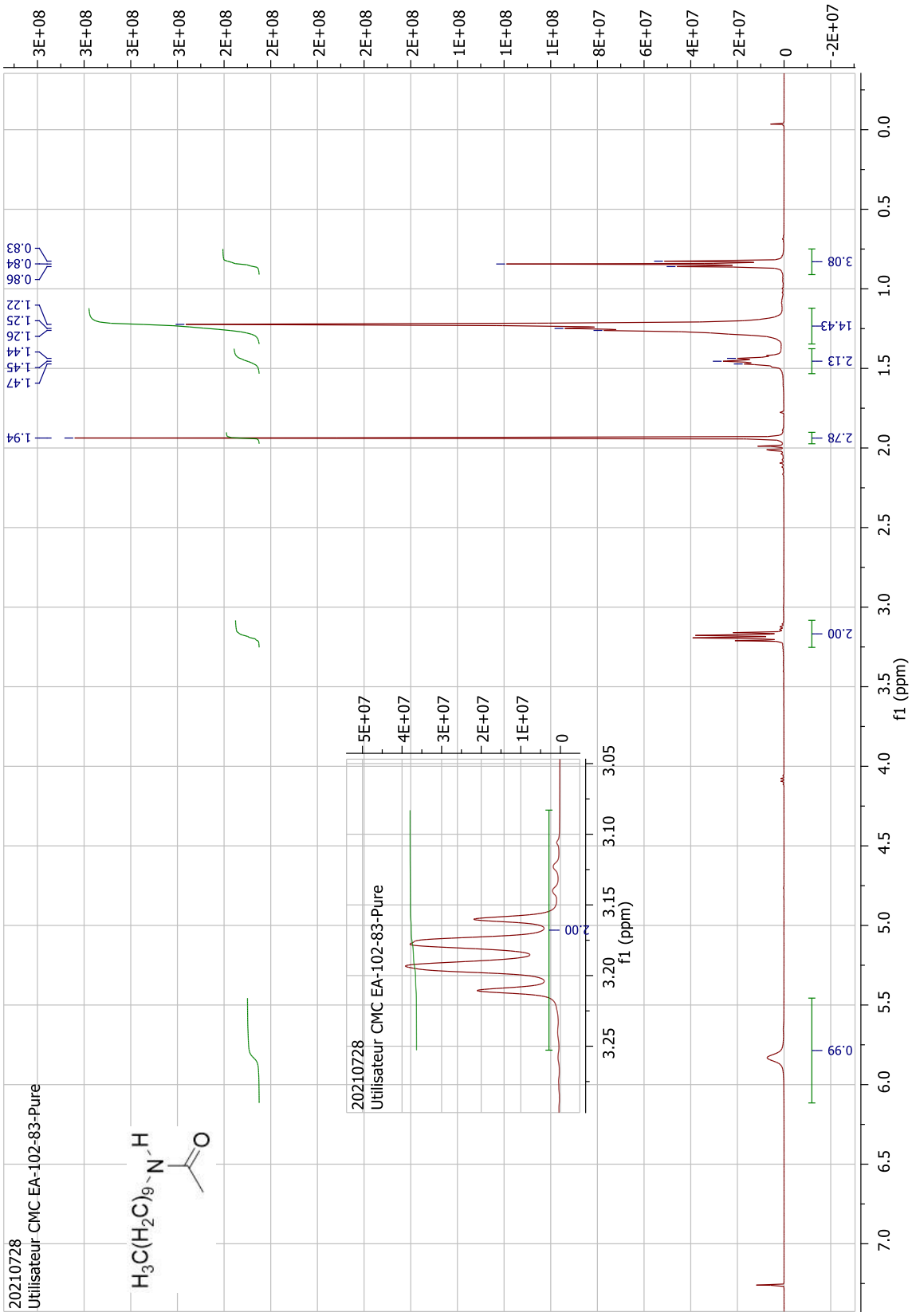


***N*-Acetyl, *N*,*N*-dibenzylamine [7] (3k) ^{1}H NMR**

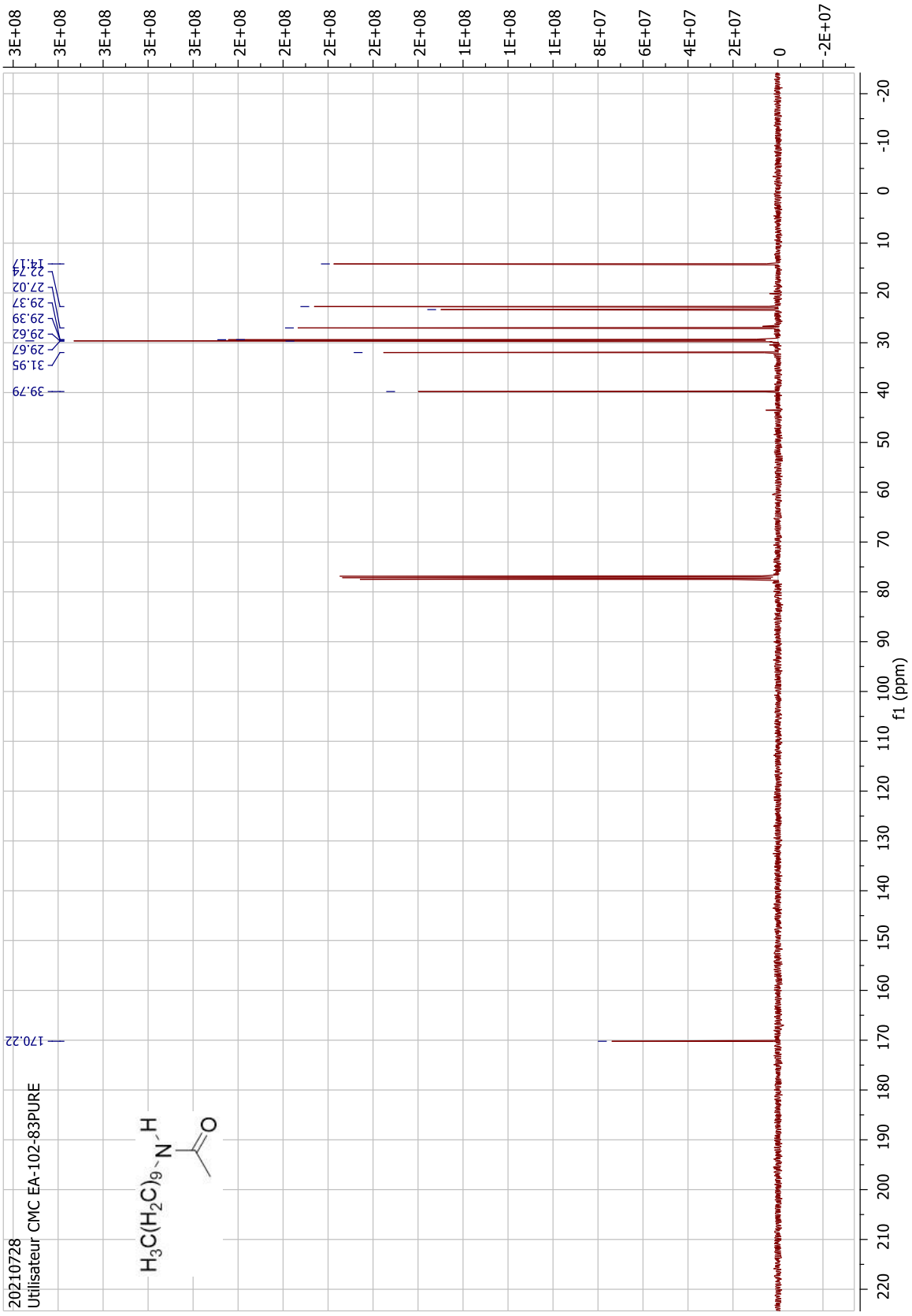
N-Acetyl, *N*,*N*-dibenzylamine [7] (3k) ^{13}C NMR



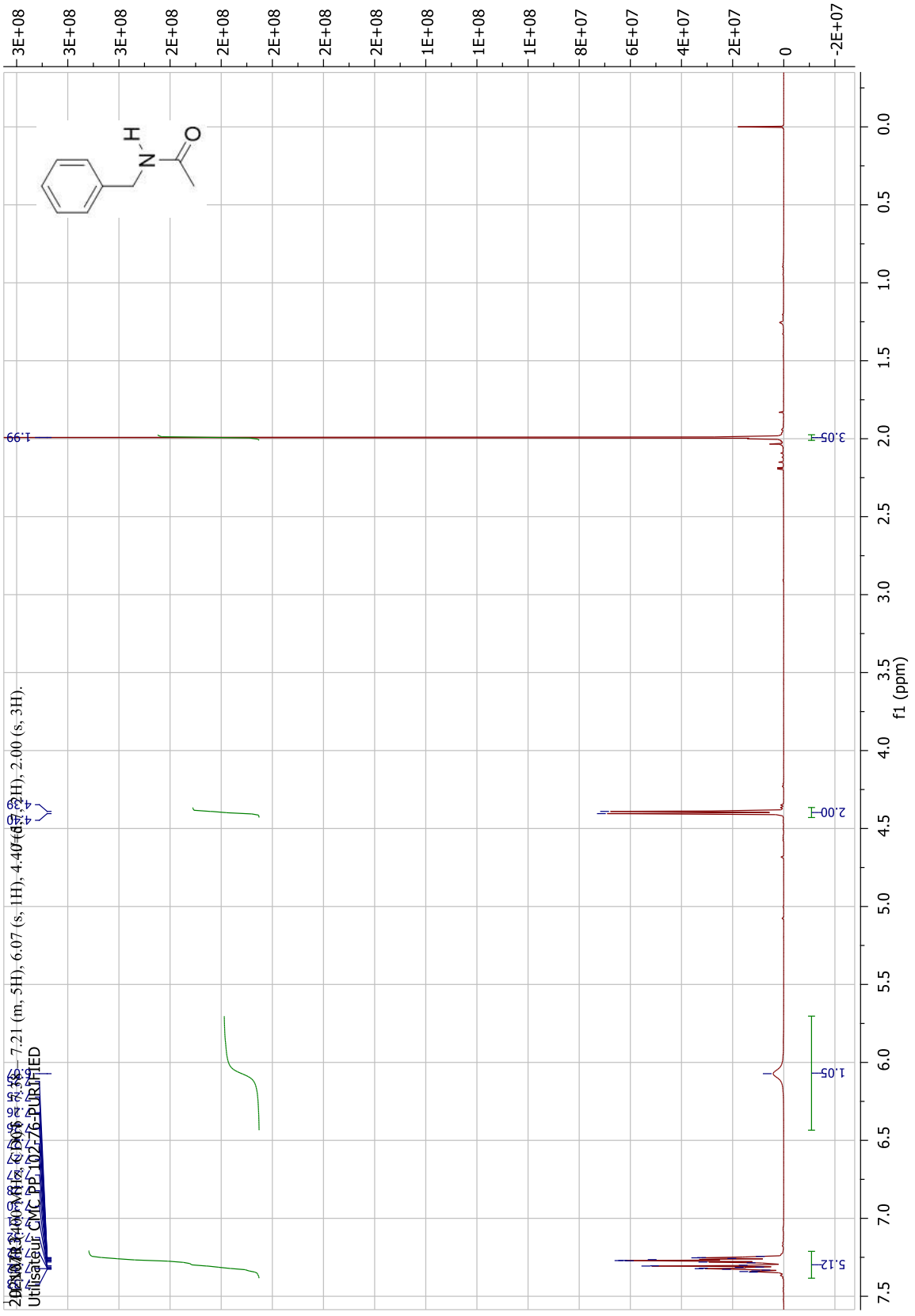
N-Acetyldecylamine[1] (3l) ^{1}H NMR



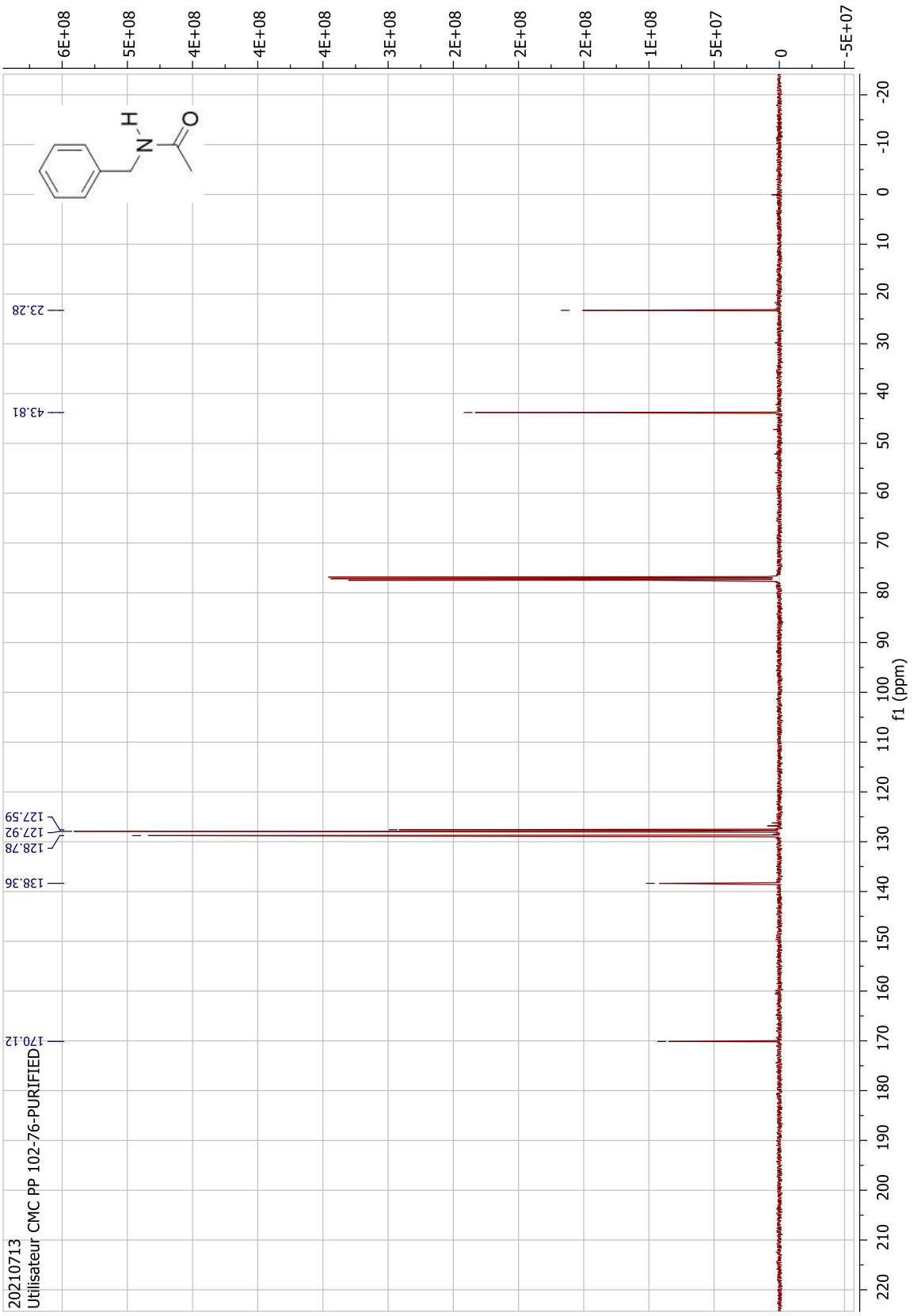
N-Acetyldecylamine[1] (3l) ^{13}C NMR



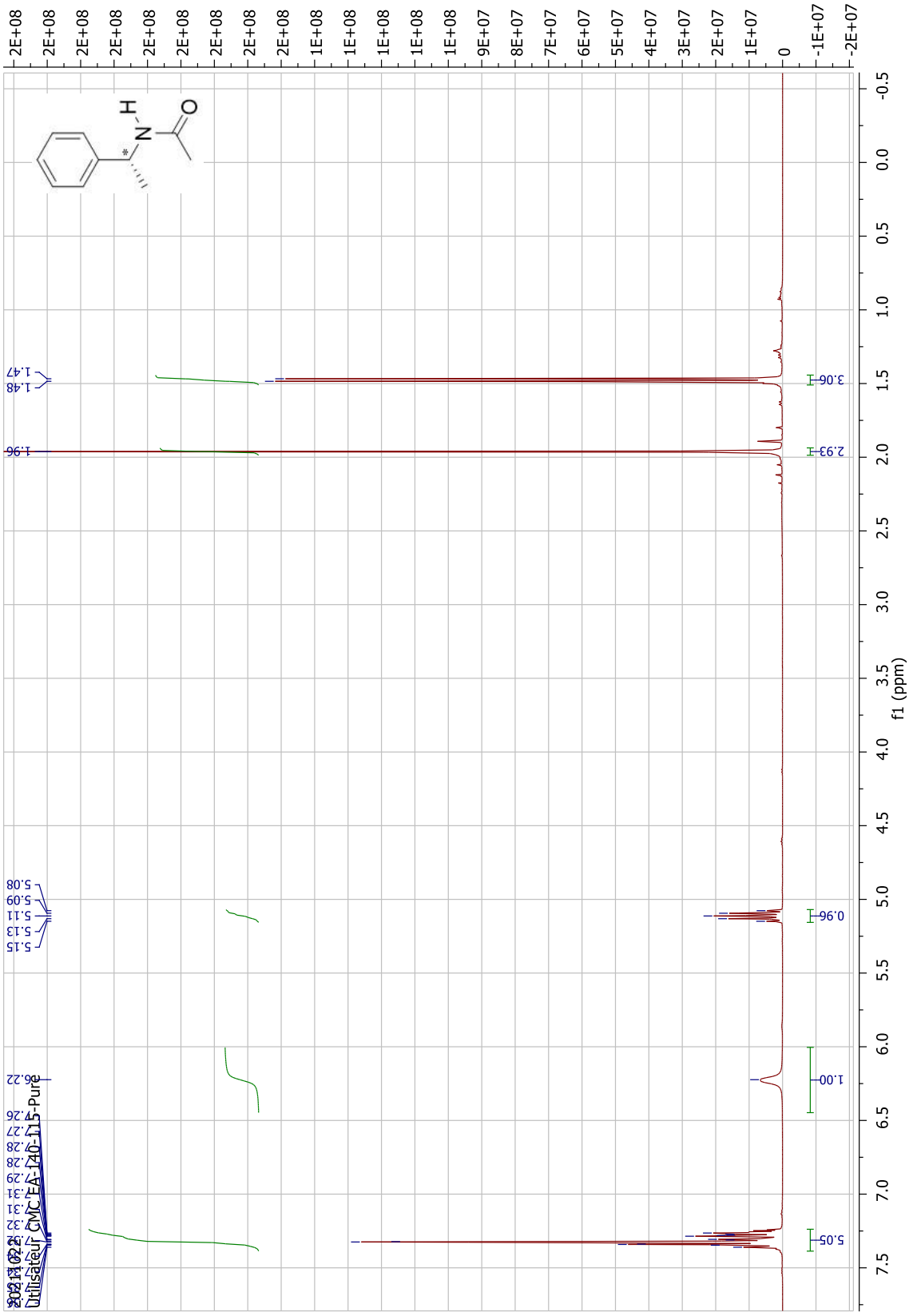
N-Acetylbenzylamine[1] (3m) ^{1}H NMR



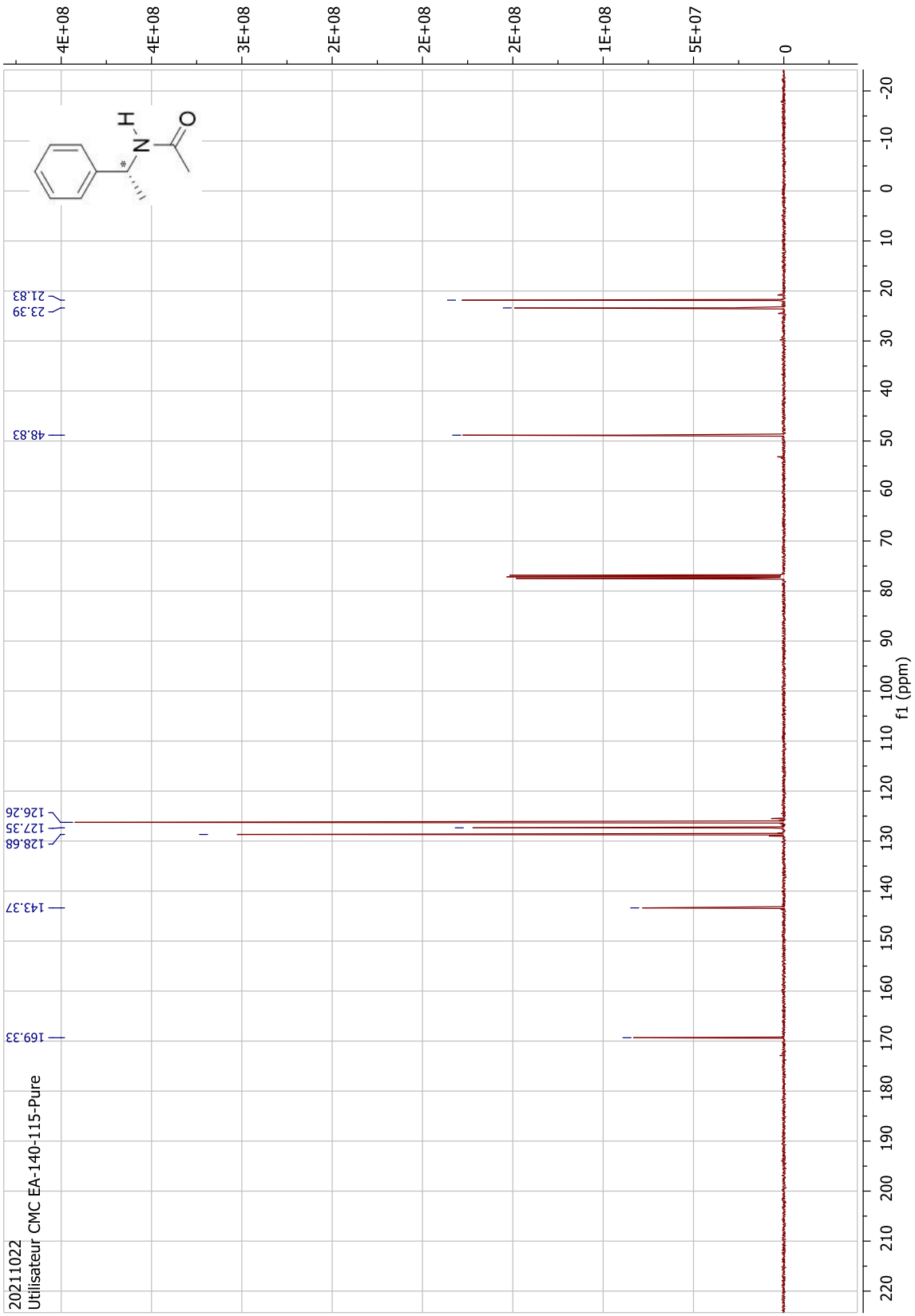
N-Acetylbenzylamine[1] (3m) ^{13}C NMR



N-Acetyl-(*R*)-phenylethylamine[1,8] (3n) ^{1}H NMR

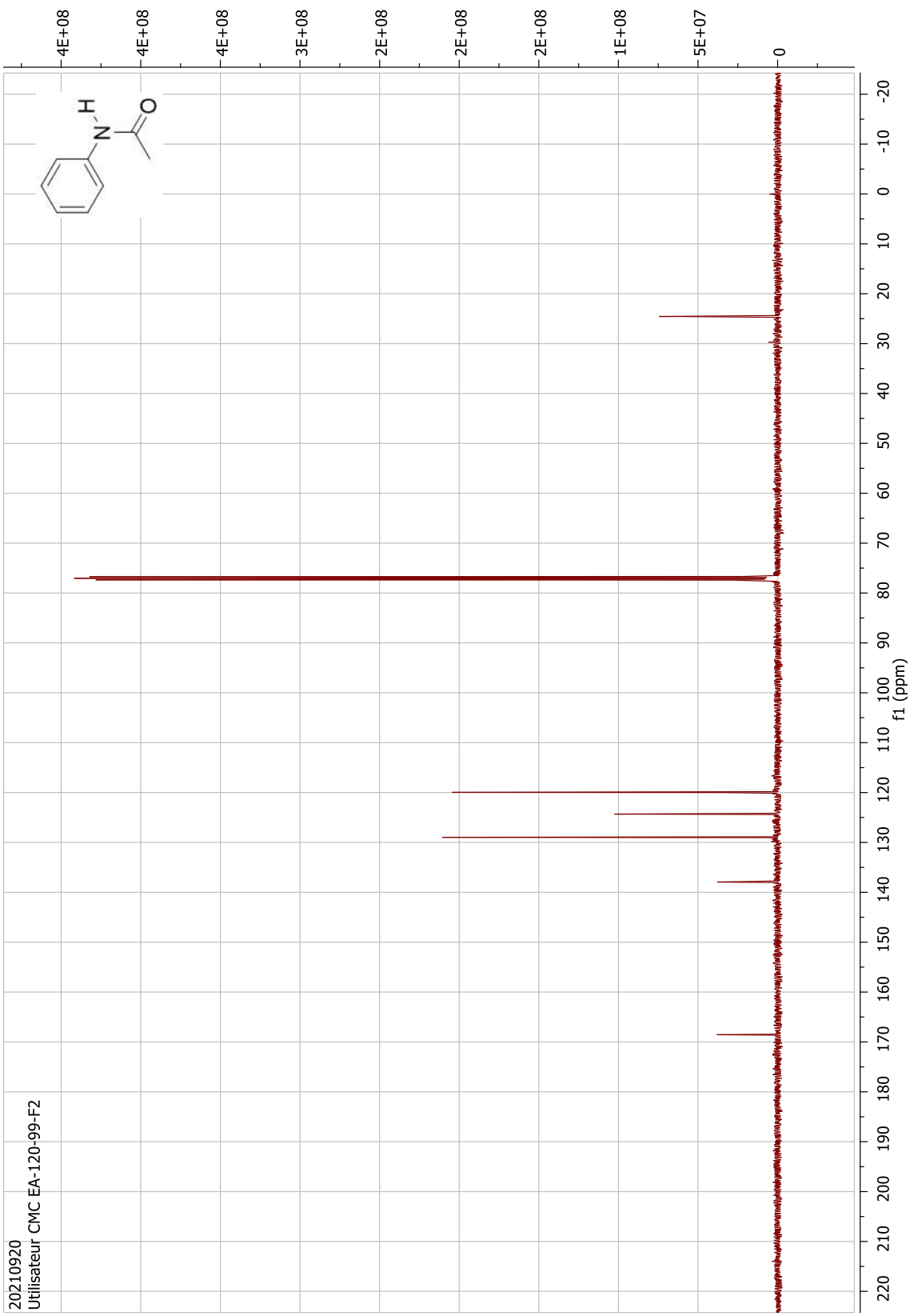


N-Acetyl-(*R*)-phenylethylamine[1,8] (3n) ^{13}C NMR

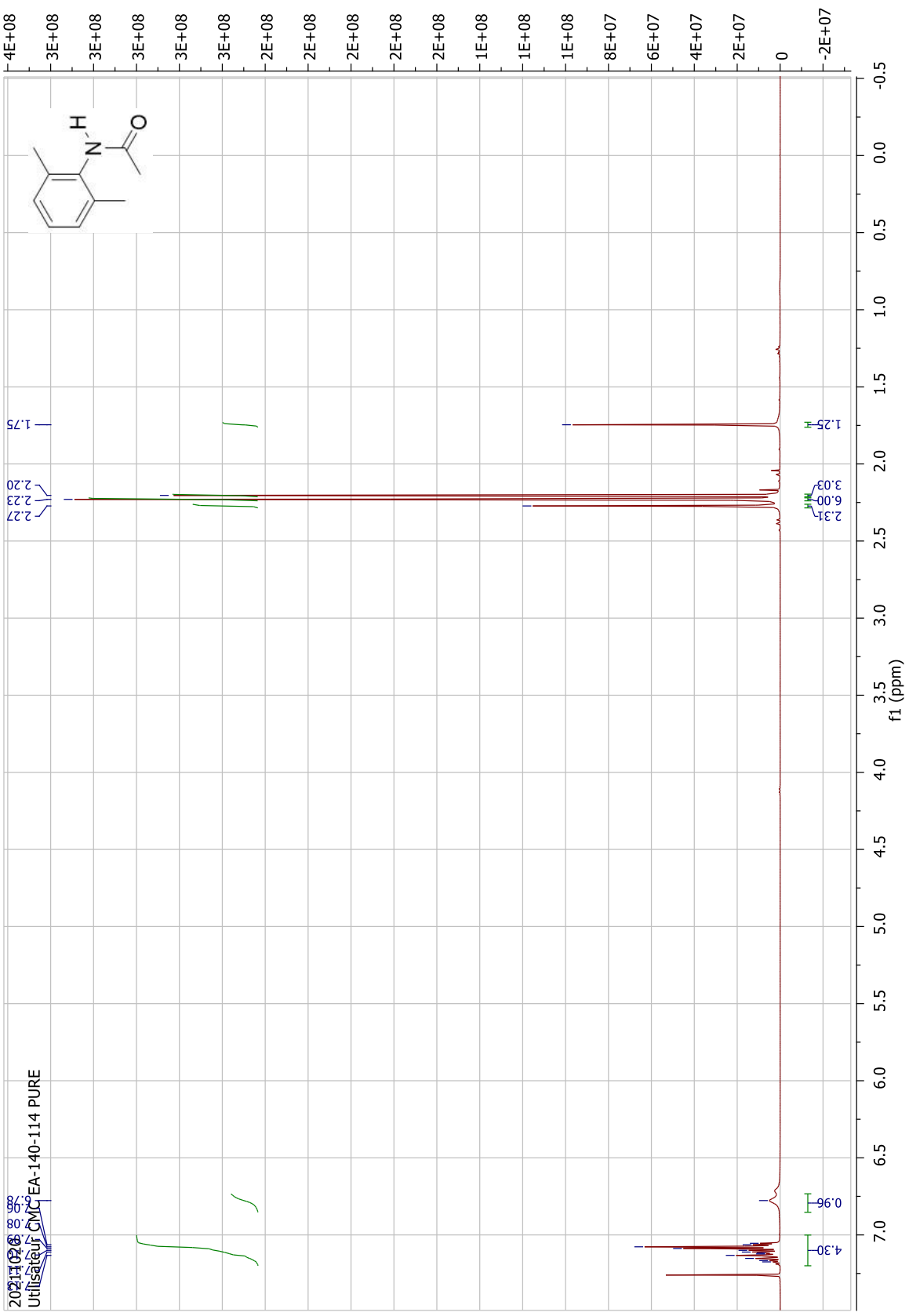


N-Acetylaniline[1] (3o) ^{1}H NMR

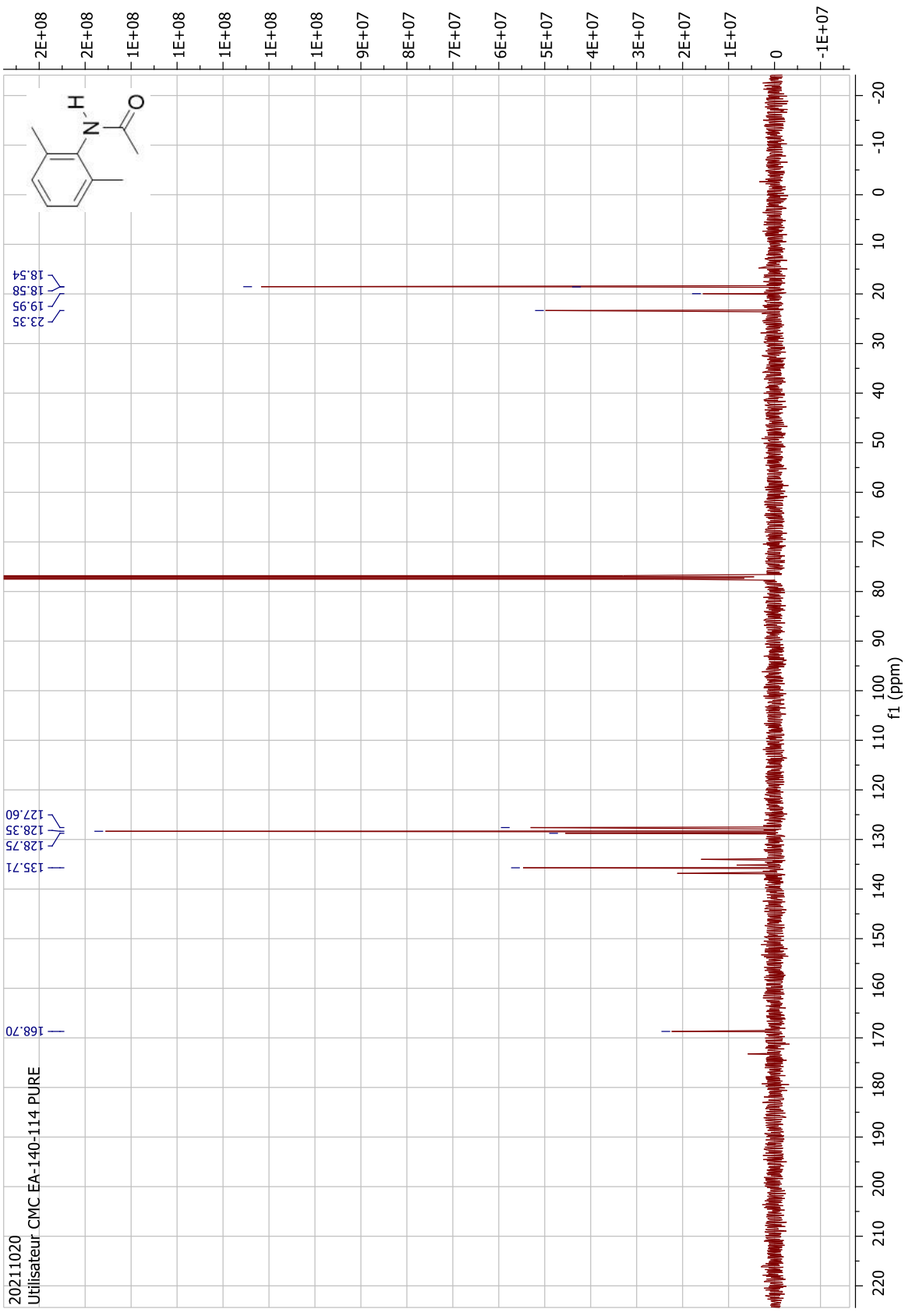
N-Acetylaniline[1] (3o) ^{13}C NMR



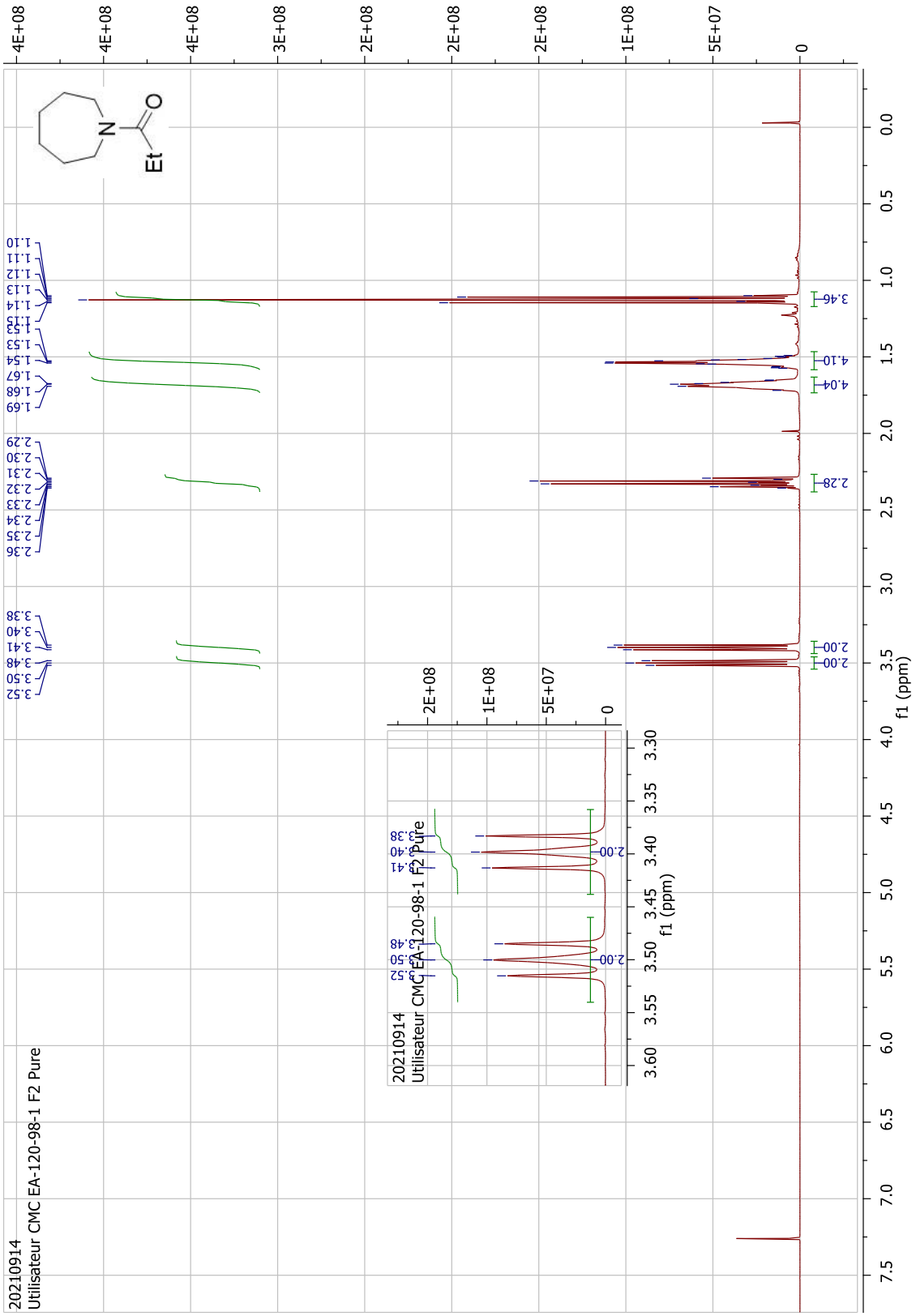
N-Acetyl, 2,6-dimethylaniline (3p) ^{1}H NMR



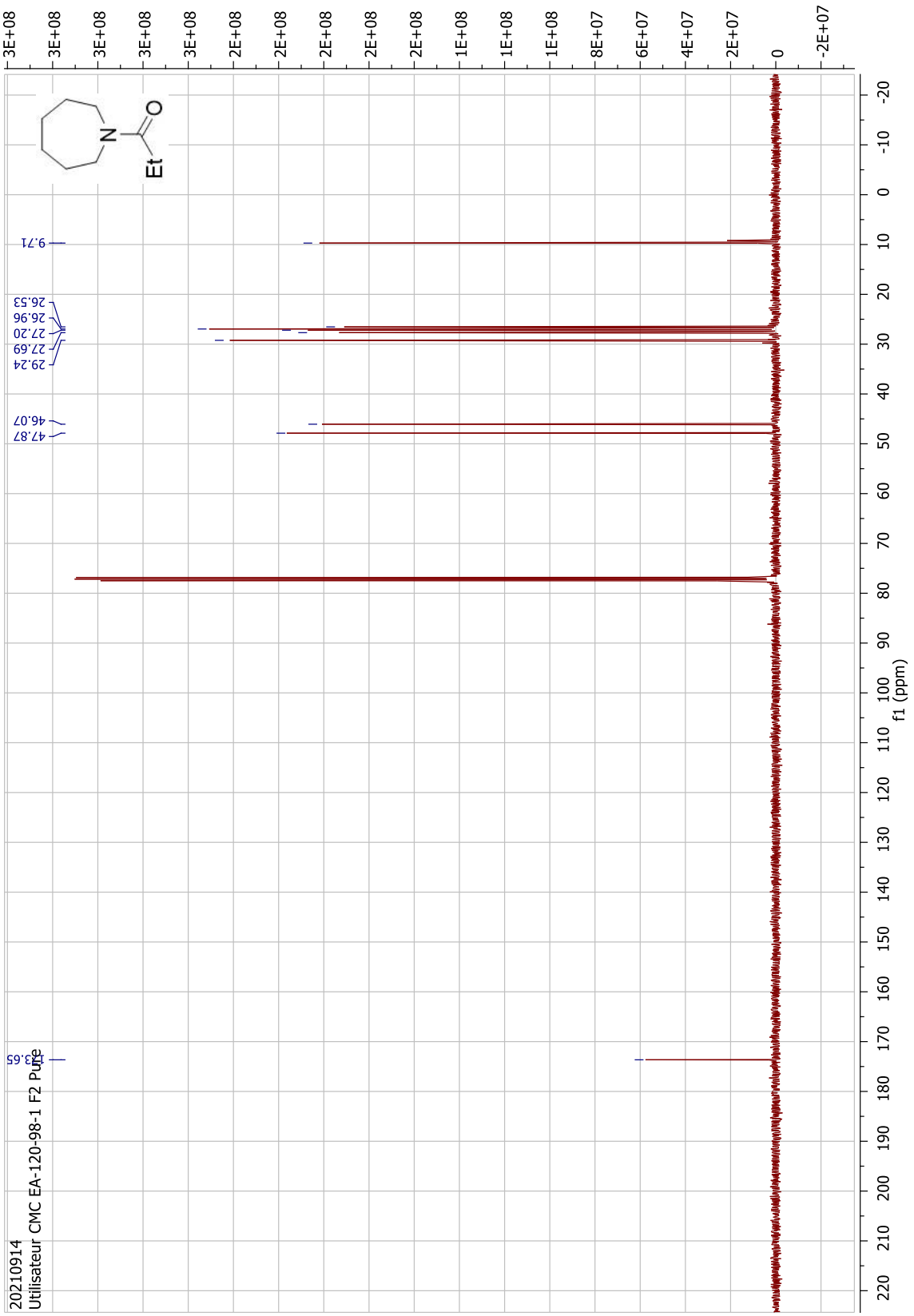
N-Acetyl, 2,6-dimethylaniline (3p) ^{13}C NMR



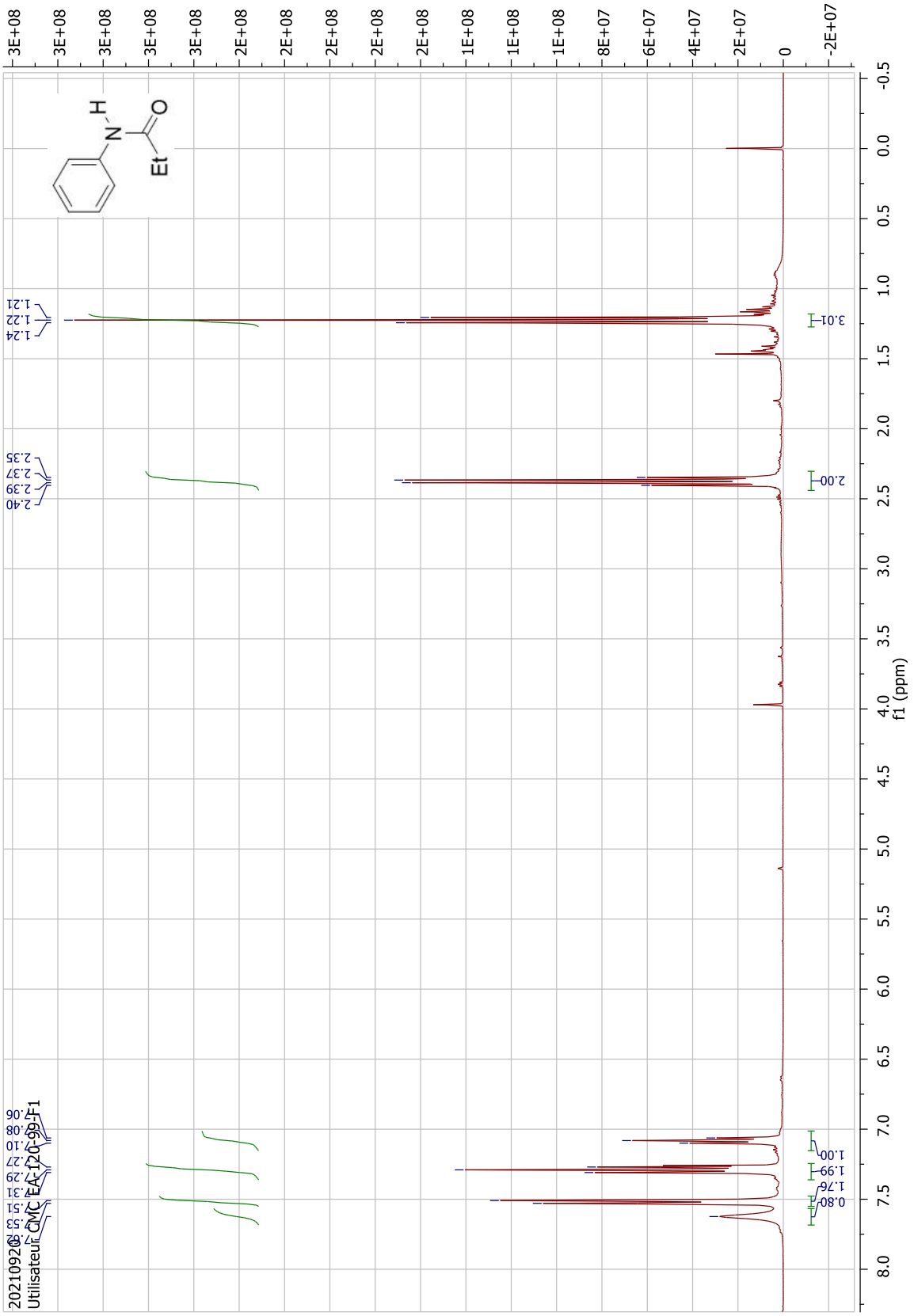
N-Azepanepropionamide[10] (3q) ^{1}H NMR



N-Azepanepropionamide[10] (3q) ^{13}C NMR



N-Phenylpropionamide[11] (3r) ^{1}H NMR



N-Phenylpropionamide[11] (3r) ^{13}C NMR